



10th MEDITERRANEAN CONGRESS OF PRM

Physical and Rehabilitation Medicine



13th NATIONAL CONGRESS OF

The Serbian Association of Physical Medicine and Rehabilitation

ABSTRACT BOOK

The Rehabilitation Medicine in the Mediterranean Area:
INTERACTION FOR REHABILITATION



29/9 - 2/10
BUDVA 2013
MONTENEGRO





10th MEDITERRANEAN CONGRES OF PHYSICAL AND REHABILITATION MEDICINE



13th National Congress of the Serbian Association of Physical Medicine & Rehabilitation (SAPMR)

**Budva, “Splendid – Conference & SPA Resort Hotel”
29th September - 2nd October 2013**

Organized by

Mediterranean Forum for Physical and Rehabilitation Medicine
and
Serbian Association of Physical Medicine & Rehabilitation

Supported by

Republic of Serbia Ministry of Health
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BOOK OF ABSTRACTS

Editors: Milica Lazovic
Design: Sanja Jovovic
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Issued September 2013



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Dear friends and colleagues,



It's a pleasure to welcome you to 10th Mediterranean Congress of Physical and Rehabilitation Medicine and 13th National Congress of the Serbian Association of Physical Medicine & Rehabilitation (SAPMR), as well. It will take place in Budva, Becici (at the "Splendid – Conference & SPA Resort Hotel"), from 29th September to 2nd October 2013.

The motto of this year congress is ***"The Rehabilitation Medicine in the Mediterranean Area: Interaction for Rehabilitation"***, meaning the necessity to intensify collaboration of regional PRM societies in education, treatment protocols, research and legislation and thus give a new rise of quality of our national rehabilitation services.

Physical medicine and rehabilitation is now one of the most positive and most dynamic areas of medicine, which led to the development of new rehabilitation methods, promotion of research and introduction of innovative programs in rehabilitation. PMR has led to the development of assistive technology that is moving out of the ordinary aids to robotics and sophisticated electronic systems for stimulation, communication, education, environmental control and increased mobility. New technologies have led to a decreased disability, increased independence, better participation and quality of life of chronic patients.

Within dynamic medical and scientific industry, such as physical medicine and rehabilitation, it is very important that continuity of knowledge and exchange of opinions is ensured. It is therefore essential for a modern Physiatrist – practitioner to monitor carefully and continuously what is happening in the world of science and medical practice. I am confident that this Congress and the book which accompanies it, will be of a significant help. Certainly, the greatest credit goes to the authors of invited lectures and oral presentations who have invested all their knowledge and experience, consulting the latest world literature, in order to achieve that goal.

This year meeting is organized under the auspices of Serbian Ministry of Health, Serbian Ministry of Education, Science and Technology, and Serbian Association of Physical Medicine & Rehabilitation. The meeting is endorsed and under the auspices of UEMS, Board of Physical & Rehabilitation Medicine and European Society of Physical & Rehabilitation Medicine. We are convinced that the congress venue is an added value since Budva & Becici coast offers wonderful sceneries in September and October.

We are grateful to all who contributed that this book, in its present form, has seen the light of day, as well as to all those who will, through their presence at the Congress and the use of this text, contribute that these events justify their existence and continue to live.

Lazovic Milica

Prof. Milica Lazovic, MD, PhD

President of 10th Mediterranean Congress of PRM
President of Serbian Association of Physical Medicine & Rehabilitation

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PRM: SCIENTIFIC AND MANAGEMENT KNOWLEDGES TO GUARANTEE HOLISTIC AND EFFECTIVE CARES FOR DISABLED PEOPLE

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Many international documents in recent years, mainly from UN and WHO, for example World Convention, ICF and recently WRD, have described how Rehabilitation and its scientific developments are focuses on Disabled People Rights to help any country to create an “inclusive” community.

Rehabilitation really involves the use of all means aimed at reducing the impact of disabling pathologies and health conditions in a global approach to solve the person’s problems in order to achieve optimal social integration. Within any health context, rehabilitation specifically is defined as “a process of active change by which a person who has become disabled acquires the knowledge and skills needed for optimal physical, psychological and social function”.

Rehabilitation include integrated social and sanitary interventions (evaluations of issues, possibilities and perspectives for person and context, in a Team form to maintain continuity, integration and synergy, following the Individual Rehabilitation Plan up to the better outcomes), many different structures, agencies and settings: so it is necessary to have a real Network.

This awareness is really important in this period, mainly in Europe, when Health Services are changing for many reasons (scientific, social and financial too).

PRM role and responsibility are to show how can be realized a wide and global rehabilitation system to defend and gain Health for all; involving and renovating many aspects of health and social services in a synergistic way to reach the best outcomes for people, in the suitablest way, reducing expenses and wastes.

Offering different cares timely, in a real continuity and coherence, involving and guiding many different professionals, maintaining the centre on the Person (possibilities, prognosis, free wishes, family and context), evaluating evidences and results on the functional outcomes.

In this general strategy the Italian National Plan for Rehabilitation is an attempt to connect different responsibilities, facilities, interventions for PRM doctors, in different times and places, modifying deeply the “traditional” relationship between Health Services and Rehabilitation.

PRM is an independent medical specialty concerned with the promotion of physical and cognitive functioning, activities (including behaviour), participation and modifying personal and environmental factors. So it is responsible of the prevention, diagnosis, treatment and rehabilitation management of people with disabling medical conditions and co-morbidity across all ages.

PRM Doctor have (as unique among Medical Specialists) the holistic approach to people (disabled or at risk being in disabling conditions) really necessary to this Network-management. They also work within the concept that the access to the full range of rehabilitation services is a fundamental human right and that the patients within PRM services have complete autonomy in directing the aims of their rehabilitation programme through informed consent and choice.

The fundamental outcomes of rehabilitation are the person’s well-being and also their social and vocational participation. The PRM specialists have a crucial responsibility to the active engagement and the learning process that the patient must go through: the principles of adaptation and plasticity are necessary as (and together) the clinical (surgical, pharmacological, technological, physical, psychotherapy) interventions.

PRM specialists are able to use these principles, which help to design strategies to enhance outcomes and avoid mal-adaptation. (motor learning and recovery, inducing skill - acquisition relevant to the patient daily’s life, preventing a learned non - use phenomenon to restore function: improving activity and enabling participation).

Rehabilitation is a continuous and coordinated process, which starts with a change of one's conditions of Functioning, Health and Participation (the onset of an illness or injury or their consequences), proceeds by a Teams Networking of many professionals and settings, closely together organised goal-oriented, patient centred manner and goes through to the individual empowerment.

PRM specialists use specific diagnostic assessment tools, taking into account the individual's personal, cultural, vocational and environmental context.

PRM specialists are the leaders of the teams involving any needed professional and are responsible for their patients' care in specialised PRM facilities. He is responsible for developing an individualised rehabilitation plan for each patient through a specific assessment and through the assessments of parents and care-givers.

Only in this way, rehabilitation is able to enhance patient functioning and participation by providing a coordinated source of information, advice and treatment for the person with disabilities and the family, with the team acting as provider and catalyst.

The most important part of the work must be a thorough understanding of the natural history of acute and chronic disabling disease, of the consequences of impairments and their impact on functioning (activity and participation), in close relation to the natural history of life, wishes and actual possibilities of the person and of the context. The Rehabilitation Prognosis needs to have a clear view on issues of personal activities of daily living, care, return to work, studying, feelings, driving, etc.

PRM specialists work in various facilities from acute care units to community settings. Unitary is the methodology (to guarantee the flow of information, patients and the audits also on scientific aims towards Evidence) and is based on the use of specific diagnostic assessment tools and the homogeneous carry out treatments including pharmacological, physical, technical, educational and vocational interventions.

In a traditional medical intervention the evaluations and prognosis are based on an analytic separation of the single bio-pathological factors followed by their rational integration into an overall sum; in contrast, a primarily PMR approach leads to considering the whole (functional, emotional, motivational and behavioural) as the primum movens focusing the parameters for determining the modality, limits and aims of the care only on this. Since health status is the result of a complex and large number of different factors, the therapeutic pathway to reach the maximum possible levels of recovery and maintenance must be equally complex, synergic and multifactorial, despite the fact that sometimes the single pathological conditions have a serious and chronically progressive course, or even a dismal prognosis.

Physiatrist's competence (and in the same time the activities and responsibilities) are:

- medical assessment in determining the underlying diagnosis (often many)
- medical treatment
- assessment of functional capacity
- assessment of activity and participation as well as contextual factors
- devising a rehabilitation plan
- knowledge, experience and application of medical, physical and technical interventions
- evaluation and measurement of outcome
- prevention and management of complications
- prognostication of disease/condition and rehabilitation outcomes
- knowledge and experience of using of rehabilitation technologies to assist at impairment, activity and participation levels
- team dynamics and leadership skills
- teaching skills
- knowledge of the social system and other related community agencies
- knowledge of legislation on disablement and of human rights of people with disabilities
- knowledge of how to get help for people with acquired and congenital disabilities due to illness or trauma

In all these aspects the cognitive, psycho-relational, learning, motor, attention, awareness patients matters are fundamental, even if the illness is not directly connected with the nervous system. And on other hand, the involvement of activities and functioning based on nervous system (the “structure” as ICF says) is necessary to evaluate the conditions and the prognosis of the person, to carry out the interventions, to support the active engagement and the adaptation of the person and of the context.

As the person is an individual, equally must be Individual the Rehabilitation Plan, equally too must be unitary the Rehabilitation Network to offer adequate and coherent services: different settings from acute to community, different services and agencies from health to social, cultural and financial, many professionals and different competencies, different times in the natural history of illness, various and integrate support for functioning and participation.

We all realise the great changes that have taken place in our perception of health, the conditions necessary for subjective wellbeing and for what we define as “quality of life”. Disorders, symptoms and phenomena that perhaps in the past were supported and considered inevitable are now no longer accepted and demands are rightly made for all treatments that can eliminate or alleviate such problems. This is causing an ever more rapid expansion in the duties and aims of Medicine, as the frontiers of the needs and requests of citizens enlarge. There is a parallel expansion in overall requests for services and performances, which are not limited only to the field of health care, but extend more generally to social policies. Of course, all this must be proportional to the real existence and potential of treatments, based on scientific evidence and not only on hopes and illusions.

The starting point of all rehabilitation activities and associated professional and organizational responsibilities is the right of the individual, in the face of whatever Participation limitation and/or Disability that alters even only transiently his autonomy, self-sufficiency and self-determination to receive a diagnostic evaluation, a prognosis and, if possible, a treatment suitable for the problem related to his overall bio-psycho-social situation; these must be understandable and controllable by everyone. Social Participation is a term that very well represents the Person’s fulfilment of this set of activities and rights.

The individual’s right is inextricably bound to the duty of society to guarantee every person all the instruments suitable for maintaining, for as long as possible and at as high a level as possible, personal autonomy in participation in social tasks. It is also society’s duty to optimise and at the same time verify the appropriate use of the many available rehabilitative instruments with respect to parameters of efficacy, efficiency and sustainability. It is equally obvious and important that all the problems of the economic sustainability of services, in proportion to the evidence of their efficacy and suitability, must be approached with complete clarity of information. Such information, first of all for the choices in the general context of the population and in parallel for individual cases, is an essential element for building active and conscious involvement in the process of rehabilitation of the Person, and of the community as far as is necessary.

PRM has the main role, and the main responsibility to create a common framework to face every these problems by adequate Rehabilitation evaluations, treatments, programmes and home/workplace modifications; involving, in different times, various institutions, places and professionals too in a real Network offering and guiding an effective global solution for the needs of the Person and of the Community.

Only the scientific and professional knowledge of a holistic approach like PRM can offer is adequate now and for the future in the interests of disabled people.

Regarding the common development of pathological and demographical aspects, mainly in Europe but in all other regions, probably only this model can be effective and sustainable in the financial field too.

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QUALITY OF CARE IN REHABILITATION SERVICES

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Quality of health care remains an area for improvement, despite the increased attention it has received in recent years. Patient dignity is a central, sometimes overlooked, facet of health care quality in hospitals and rehabilitation services.

Quality Management (QM) in rehabilitation facilities is characterized by continuous efforts to further include and realize the requirements and demands of patients, relatives, employees, payers but also referring doctors and hospitals. It is a systematic and continuous process focusing on identification, analysis and improvement of quality of structures, processes and results.

Among the main requirements for the QM are:

- Evidenced based and international state-of-the-art guidelines and rehab protocols
- Monitoring, evaluation and assessment of measures on all levels (technical services, administration, nursing, rehab medicine and therapy, etc.)

The final goal should be a continuous work on and the increase of patient and staff safety, patient satisfaction, medical outcome and effectiveness.

Using a systematic approach to PRM service delivery, one may see the relationship between disease (through ICD), function (through ICF), and interventions (through services and health interventions). The instruments of Quality Assurance (QA) should include the International Classification of Functioning, Disability and Health (ICF) of WHO.

As a specialty, PRM supports the use of quality measures, however, unlike many other physicians who are held to diagnostic-specific quality measures, physiatrists concentrate on functional outcomes with a wide degree of inter-patient variability which poses unique challenges to creating meaningful and specific quality measures and to developing performance measures. While there are a number of measurement sets applicable to various settings of rehabilitative care, there is no generally accepted or universally applicable outcome measures for disability or functional status that have been nationally endorsed for quality incentive reimbursement.

Specialists in Physical and Rehabilitation Medicine play a complex and strategic role in the QA, which starts with a clear medical diagnosis, a functional and social assessment and continues with the definition of the different goals to achieve, according to the patient needs, the set up of a comprehensive strategy, the achievement of personal intervention and the supervision of team or network cooperation. It ends after a final assessment of the overall process.

**WORLD REPORT ON DISABILITY FROM WHO: A GUIDE TO DEVELOP REHABILITATION
AND DISABLED PEOPLE'S RIGHT IN MEDITERRANEAN REGION**

Alessandro Giustini (Italy)

More than a billion people experience disability, and global trends such as the ageing population and the global increase in chronic health conditions mean that the prevalence of disability is rising. After United Nations Convention on the Rights of Persons with Disabilities (CRPD), attention has focused on ways to combat discrimination, promote accessibility and inclusion, and promote respect for people with disabilities.

We all realise the great changes that have taken place in our perception of Health, of subjective wellbeing and about what we define as "quality of life". Disorders, symptoms and phenomena that perhaps in the past were tolerated and considered inevitable, now are no longer accepted: many demands are rightly made for treatments that can eliminate or alleviate such problems.

It is changing the GOAL ! And Rehabilitation is the centre of this transformation: demand is growing and there is a parallel growth in the scientific potential to modify disabilities that previously could not be treated with success.

In any part of the World tree forces mainly support Rehabilitation development:

Disability and participation restrictions are visible and concrete demands for us and for the Community. Science (research, evidence, efficacy, education...) is absolutely necessary but not sufficient to promote interventions.

Rights on the contrary are the indispensable motive power and the justifications for increasing investments.

CRPD shows that disability and rights are intimately interlaced: Disability is a condition of life that is either permanent or temporary for millions of people and on the other hand people with disabilities must be empowered and granted access to essential resources to be able to lead optimal lives. This moral and in the case of signatory countries to the Convention legal concreteness of this groundbreaking document is now becoming ever more visible in both high resourced countries where the demand of rehabilitation, technologies, and advanced and innovative care has to adhere to criteria of scientific evidence base, sustainability and efficacy as well as in low and medium resourced countries where deep rooted and systemic interventions to construct simple services for health, prevention and rehabilitation are urgently needed.

The 2011 World Report on Disability sintesizes contents and concrete possibilities creating a sort of AGENDA for any Country to encrease step by step the Rehabilitation to defend rights and quality of life for disabled peoples.

This pioneering Report provides evidence to support policies and programmes that can improve the lives of people with disabilities. Drawing on the best available scientific evidence, this report is a valuable resource for policy-makers, service-providers, professionals and people with disabilities themselves.

-The Report promotes different approaches to meeting these challenges. It hereby links the rights based approach to disability with two fundamental components behind successful inclusion and participation - the community and empowerment. This notion has been a long standing tradition in developmental studies and has been previously included in the concept of Community Based Rehabilitation . Both components, community and empowerment, essentially capture from the very distinct individual perspective and broader life areas every aspect of a person's own resources within the family and community in interplay with the social, culture and economic context, and the disability. Rehabilitation of the individual and more specifically Physical Rehabilitation Medicine is impossible or completely ineffective without a prominent role of the community in any of its aspects - a fact the discipline has always recognized and reiterated recently .

Mediterranean Forum can be a very important common "table" to diffuse these contents, to exchange experiences and perspectives, to enrich the awareness and role for PRM specialists in this global attempt. Our close cooperation is the best basis to support one another's efforts .

**ASSESSMENT OF PERSONS WITH GAIT ABNORMALITIES IN PHYSICAL AND
REHABILITATION MEDICINE SETTINGS**

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The first step in the assessment of patients with gait abnormalities in physical and rehabilitation medicine settings is a clinical examination based on the International Classification of Functioning, Disabilities and Health. Body structure, activities and participation, and environmental factors (physical and human factors) must all be assessed. Qualitative and quantified assessments of gait are part of the activity and participation evaluation. Scales are also used to assess gait activities. Gait assessment tools can be used in laboratory environments for kinematic, kinetic, electromyographic and energy consumption analysis and other tools, such as videotape and walkways, can be used in clinical practice, while ambulatory assessment tools can be used to analyse patients' usual everyday activities. The aims of instrumental gait assessment are: to understand the underlying mechanisms and the aetiology of the disorders, to obtain quantified gait parameters, to define suitable therapeutic methods, and to follow the course of the disease.

ELECTRODIAGNOSIS OF THE RESPIRATORY SYSTEM

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Previously, the diaphragm was thought to be the only important contracting muscle during quiet breathing in humans. Now it is known that the diaphragm together with the scalenes and the parasternal intercostals are the primary inspiratory muscles, and that during expiration in most body positions except during lying the abdominal muscles and the transversus thoracis muscle (also called triangularis sterni or sternocostalis muscle) are regularly active, making quiet expiration an active process instead of a purely passive maneuver as was previously thought. The external intercostal muscles, the levatores costarum longi and breves muscles, the sternocleidomastoid muscle, and the serratus posterior superior and inferior muscles can be regarded as accessory inspiratory muscles. The pyramidalis and internal intercostal muscles are regarded as accessory muscles of expiration.

Several neuromuscular disorders, such as amyotrophic lateral sclerosis, Guillain-Barré syndrome, muscular dystrophies, myasthenia gravis, brachial neuritis, critical illness neuropathy, leprosy, metabolic disorders etc. can affect respiration, often in the critical care unit. Nowadays, electroneuromyographic techniques can be applied and can be of great value in more precisely determining the nervous system cause, if present, for respiratory failure or insufficiency.

Several electrodiagnostic techniques now are available to examine the respiratory muscles and their innervation. Nerve conduction studies of the phrenic nerve and intercostal nerves, and needle as well as surface electromyography of most respiratory muscles can be performed. To measure central conduction in order to assess the integrity of the corticospinal tracts and central respiratory drive magnetic transcortical and nerve root stimulation now can be performed.

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**ASSESSMENT OF THE NET EFFECT OF REHABILITATION AFTER SPINAL CORD INJURY
AND GENERALIZATION TO OTHER AREAS OF REHABILITATION MEDICINE**

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Introduction: To promote the quality of rehabilitation, decisions in rehabilitation should rely on quantitative assessment of the rehabilitation potential and of the actual achievements of rehabilitation. An original approach for assessing potential and achievements in rehabilitation medicine is proposed. This approach is based on defining observed variables as a fraction of their maximum possible value, while controlling for confounding factors. The spinal cord injury ability realization measurement index (SCI-ARMI), is presented as a model for the application of the proposed approach.

Materials and methods: SCI-ARMI represents the ability realization, defined as the ratio of the observed Spinal Cord Independence Measure (SCIM) III score, and the maximal possible SCIM III score, that reflects the relationship between task execution and ICF capacity. Three versions of the SCI-ARMI formula were developed. The last one is quadratic and based on the SCIM III values 95th percentile that represents capacities corresponding with given American Spinal Injury Association Motor Scores (AMS). This formula, was generalized for international populations, and adjusted for age and gender, based on data of 661 spinal cord lesion (SCL) patients, from six countries.

Results: The SCI-ARMI formula was found valid for large SCL populations from various countries. Age and gender affected its values ($p < 0.04$), but country information, did not ($p > 0.1$).

Conclusions: SCI-ARMI is a measure that assesses rehabilitation potential and achievements. It can be compared and summed up with other measures, which are presented as realization of maximal values, and contribute to evaluation of overall achievements of a person, a rehabilitation ward, or a hospital. The principles of this development can be generalized to other areas of rehabilitation medicine, and improve decision making and outcomes.

Key words: Quality assessment, effect of rehabilitation, ability realization, SCIM, SCI-ARMI

PL – 07

MEDITERRANEAN FORUM OF PRM – ITS PAST, PRESENT AND FUTURE

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The history of the MFPRM, established in Herzliya, Israel in May 1996, is to be presented.

Congresses followed each two years in different countries, always at the coast of the Mediterranean Sea.

The founders and the most active colleagues committed and dedicated to the idea of joint PRM future in the Mediterranean have been late Prof. Heim Ring and Prof. Nicolas Christodoulou.

From the beginning MFPRM had more support and recognition from the ISPRM, while official European bodies had some hesitations and doubts.

However, the idea of establishing international rehabilitation forums has extended with the Baltic PRM Forum and the European Forum for Research in Rehabilitation.

The importance of the rehabilitation medicine is growing, all over Europe.

The evidences, with special emphasis to the Mediterranean countries will be presented.

HAIM RING SCHOOL TO THE 10TH YEAR OF ACTIVITY

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The Euro Mediterranean School was founded in 2005 in Syracuse, where the school activities are located. The school was born as will of the Mediterranean Forum of Physical and Rehabilitation Medicine in association with the Scientific Societies of Rehabilitation, SIMFER in particular.

The charter members of the School, named Euro Mediterranean Rehabilitation Summer School (EMRSS), were: the national and regional SIMFER (Italian society of Physical medicine and Rehabilitation); the Archimedes University Consortium, the Megara Ibleo University consortium. Simultaneously with the School Charter, the regulation for the School functioning was approved, as well as the Board of directors with Dr. Francesco Cirillo, founder of the School, as the first President.

The School aims at implementing, on a biannual base, a highly specializing program addressed to young Medical trainees in Physical Medicine and rehabilitation. The program theme, chosen every year, is developed by major experts in the field and allows the trainees to improve their competence about the subject. Each year, the trainees are 40, 20 of whom as representatives from the Euro Mediterranean area are chosen by the presidents of the scientific societies of the different countries. The remaining 20 are Italians and they are chosen by the Directors of the Specialization Schools.

The program is for free and the students are hosted in affiliated B&BS, which are free of charge for them.

In November 2005, the first program was offered in Syracuse. The main topic was ‘Electromyography and the treatment of spasticity with the botulinic toxin’. In November 2006, the second program was organized. The theme was ‘Pain and Mobility’. In October 2007, the third program was about ‘High care and Rehabilitation’, with the active cooperation of the Civil Protection Service, the National military police of Rome, the Carabinieri RIS Corps and the Italian Red cross. In October 2008, the fourth edition was held with the theme ‘Prosthesis and orthotics in rehab’. In 2008, the school was entitled to Haim Ring, Israeli eminent scientist who co-founded the school and died prematurely. The top local regional and national authorities attended the ceremony, which was supported by the Israeli Embassy in Italy. Also in 2008, the board of directors approved the admittance of the Syracuse Sant’Angela Merici Foundation as an active member in the Association. As a result, the Foundation made didactic facilities and secretary personnel available to the School. As time went by, the sponsorship by ESPRM and ISPRM was granted. In 2009, the program topic was: “Spinal diseases”. For the first time, beyond the young doctors from the Euro Mediterranean area, trainees from Belgium and Poland were allowed in, indicated by ESPRM. The 2010 theme was “Stroke, from A to Z”; some military doctors from the Jordan army attended the course. In 2011 the topic was highly interesting on a scientific and social basis. It was about ‘Rare diseases, disabilities and rehabilitation strategies’. For the first time, it was sponsored by W.H.O., the Higher Health Institute of Rome, and Telethon, which sent their representatives. The innovation was the participation of U.E.M.S.S., which supported the students from Ireland and Hungary. In 2012, the program was not held in Syracuse because it happened to be at the same time as the 9th Mediterranean Forum of PRM Congress, in Sorrento. The opening of the Congress was, in fact, dedicated to the Euro Mediterranean School with the participation of many students but, above all for the first time, the former students of the school were the lecturers.

Up to 2012, so far the School has hosted beyond 300 trainees and 100 professors coming from the following countries: Portugal, Spain, Italy, Slovenia, Croatia, Bosnia, Montenegro, Serbia,

Albania, Greece, Turkey, Cyprus, Syria, Jordan, Israel, Tunisia, Egypt, Belgium, Poland, Ireland, Hungary, favoring cultural growth, exchanging experiences and growing friendship among people of different cultures.

This year, the program will start over again in Syracuse, with its 9th edition about: RECENT TRENDS IN SPINAL CORD INJURY REHABILITATION. The Program will be organized on October 21st to 24th 2013 and, for the first time, there will be a 'full immersion' session at the Catania Spinal Unit, the most important of southern Italy. 40 students from Euro Mediterranean area will be hosted as usual.

Therefore, we are moving towards our 10th year of activities in 2014. A big event will celebrate that: we are planning a convention where all of the trainees who attended the program during the 10 years will be invited. They will have the chance of meeting again in Syracuse where they first met and shared solidarity moments. Former students will be invited to talk about different topics. The professors who followed them with admirable dedication will moderate the event.

Syracuse! The most important centre of Greek culture in the Mediterranean area links its name to important characters of ancient arts and culture: Pindar, Aeschylus and Archimedes are only a few of them. Its human, cultural, architectural and artistic stratification makes Syracuse unique in the history of the Mediterranean Sea. Crossroads of civilizations, many different communities marked Syracuse history: from the Greeks, which founded it in 737 B.C. and made it so great as to compete with Athens itself, to the Romans; from the Byzantines to the Arabs; from the Normans to the Svevians, from the Angioinis to the Aragonians, from the Spaniards to the Borbons. The town is universally known and today it is included in UNESCO's World Heritage List.

Syracuse is waiting for you! Between myth and legend, art and culture, landscape and good food, Syracuse welcomes young people, sharing magical moments with them, in the enchanting scenario of Ortigia.

All the information about the School and the snapshots about the previous programs are on our website www.emrss.it (please visit it!).

DISABILITY AND THE FUTURE OF AN INTEGRATIVE, HOLISTIC, QUANTUM MEDICINE

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Rehabilitation Medicine is very often the “Final Common Pathway” (Sherrington) for many of the medical specialties, because patients with chronic health conditions end up being more or less disabled.

But what should we do for our patients when we have reached at a maximal medical improvement, the end of the FCP? What are the perspectives for the patient and the health professional from this point ahead? Are we satisfied with what we see, know, and with what we can do for our patients from this point on?

We will discuss the concept of Disability as it is explained in official International Documents, e.g. ICF, World Report on Disability, White Book of PRM, etc. As it has been often underlined in these documents and many other papers, disability is complex, dynamic, multidimensional, often contested; it is an evolving concept depending on societal, cultural, financial, religious realities.

Many papers and documents, including the WRD, have clearly shown that D is not an attribute of the person, but the result of the interaction between persons with impairments and attitudinal and environmental barriers that hinders the persons full participation in society.

Starting from this reality we will try to find possible matches of Rehabilitation Medicine and more unconventional approaches to healing: integrative, holistic and quantum medicine.

The result will be surprising!

THE CREATION OF THE MEDITERRANEAN FORUM OF PHYSICAL AND REHABILITATION MEDICINE (MFPRM) AND ITS ROLE TO THE DEVELOPMENT OF REHABILITATION TO THE MEDITERRANEAN COUNTRIES

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The lecture refers to the history of creation of the Society “Mediterranean Forum of Physical and Rehabilitation Medicine” (MFPRM) in 2000, its aims and its functioning through the years till today. How it was expanded from 14 initial members to more than 550 Mediterranean members. How it has contributed to the development of the Rehabilitation Services in the Mediterranean countries, through the organization of Mediterranean PRM congresses every 2 years, by organising interactive sessions for education and research and for adopting a model of Rehabilitation Services by the Mediterranean countries.

The MFPRM was created during the 3rd Mediterranean PRM congress in Athens in 2000, organized by Xanthi Michail. The idea was discussed four years ago, when the late Prof. Haim Ring asked pioneers from several Mediterranean countries to discuss the viability of such a Society. The first Mediterranean PRM congress was organized by Haim Ring in Herzliya of Israel in 1996 and the second by Ramon Gomez Ferrer and Antonio Hernandez Royo in Valencia of Spain in 1998. Since the creation of the Society they have been organized the 4th congress by Franco Cirillo in Syracuse (Sicily) of Italy in 2002, the 5th by Tansu Arasil in Antalia of Turkey in 2004, the 6th by Jorge Lains in Vilamora of Portugal in 2006, the 7th by Crt Marincek in Portorose of Slovenia in 2008, the 8th by Nicolas Christodoulou in Limassol of Cyprus in 2010, the 9th by Raffaele Gimigliano in Sorrento of Italy in 2012 and this year is organised the 10th congress by Milica Lazovic, president of the Serbian PMR Society, in Budva of Montenegro.

Many of these congresses were offered hosting the Interim meetings of the ISPRM and thus managed to attract experts in their own field of PRM from all over the World, contributing to the advancement of knowledge of the participants Mediterranean colleagues. Training in several workshops was contributing to the practical implementation of the new and classic knowledge.

The aims according to our Statute are: MFPRM to be the scientific Mediterranean body for physicians working in 3 Continents, Europe, Asia and Africa, around or with close vicinity with the Mediterranean Sea, in the fields of Physical and Rehabilitation Medicine. To facilitate Mediterranean exchange regarding research, projects, meetings and congresses. To influence national governments, in close co-operation with the national society of PRM by providing information to national governments about the contents and evidence based efficacy of PRM and disability issues.

The MFPRM is open free (no fees) to all qualified physicians specialised in PRM and to physicians being at the final stage of their PRM training who are working in any Mediterranean country or a country with close vicinity with Mediterranean Sea, irrespective of race, religion or community. The Society till now has members from the following countries: 1. Albania, 2. Algeria, 3. Bosnia, 4. Bulgaria, 5. Croatia, 6. Cyprus, 7. Egypt, 8. France, 9. Georgia 10. Hellas, 11. Israel, 12. Italy, 13. Jordan, 14. Lebanon, 15. Libya, 16. Malta, 17. Moldova, 18. Montenegro, 19. Morocco, 20. Portugal, 21. Romania, 22. Serbia, 23. Slovenia, 24. Spain, 25. Syria, 26. Tunisia and 27. Turkey. A Board contacts the works of the MFPRM and is consisted of seven active members and is elected every two years by the Council members of the General Assembly, organized during the biannual Mediterranean Congresses. The first president was Prof. Nicolas Christodoulou from Cyprus, who was succeeded in 2010 by Prof. Jorge Lains from Portugal.

The Society MFPRM adopted as official scientific journal “Minerva Medicophysica” and helped this journal, with the co-operation of the new Editor in Chief Stefano Negrini to change its title to “European Journal of Physical and Rehabilitation Medicine”, to become indexed and today

to have the highest impact factor among the journals of our specialty. The interested MFPRM members can be subscribers of the journal with a very low subscription fee.

Under the auspices and encouragement of the MFPRM, a School was created in Syracuse of Sicily in 2005 by Franco Cirillo. Every year the "Haim Ring Euro-Mediterranean PRM School" accepts for five days about forty young trainees or specialists during the first five years of their practice from all the Mediterranean countries. The participants attend both theoretical and practical sessions free and they only have to pay their flying tickets. The topics of the lessons are of current interest. Till now the topics of the School were: 1st 2005 General Concepts of PRM, 2nd 2006 Pain and mobility, 3rd 2007 Rehabilitation and High Care, Emergency Medicine, Osteoporosis, Oncology, Medicines, Physical Therapy, 4th 2008 Neurological Rehabilitation, Prosthesis & Orthosis, Biometrics, Physical Therapy, 5th 2009 Spinal Diseases and ICF, Functional Anatomy, Pathophysiology, Clinical Applications, Instrumental Diagnostics, Pain, Scoliosis, 6th 2010 Stroke from A to Z, 7th 2011 Rehabilitation in genetically and non genetically determined rare diseases, 8th 2012 Joined with the Sorrento Medit. Congress, 9th 2013 Recent trends in Spinal Cord Injuries Rehabilitation. For his invaluable services to the Society, Franco Cirillo was inaugurated by the General Assembly in 2008, as an honorary Board member.

The MFPRM created its own WEB SITE (www.mfprm.org), where the members can find all the current information for PRM, historic documents and details for the coming Mediterranean congress. Thanks to the Secretary Pr. Gulseren Akyuz and other Turkish colleagues a sponsor was found who covers all the expenses for the MFPRM web site.

The MFPRM has a long-term Action Plan, which is implemented through several committees, with the aim to develop the Society and mainly the Rehabilitation Services in all the Mediterranean Countries. These committees are for: Communication and Information (website, journal, newsletters), Scientific Events, Research projects, Contacts with Disabled People Associations, International Activities Co-operation, Mediterranean Clinical Guidelines and Educational Activities.

60 YEARS OF MEDICAL REHABILITATION IN SERBIA

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Serbia

In 1950 the United Nations adopted the resolution which officially promoted the postulates of rehabilitation for the disabled. Turning those postulates to practice was the issue of advisors and technical assistance, also offered by the UN.

The former Yugoslavia was among the first ones to ratify the UN and WHO accepted documents and also among the first to ask for assistance in this field. Dr Henry Kessler from New York was assigned, as an UN rehabilitation expert, to help form a rehabilitation facility in Belgrade and help in education of future rehabilitation team members. On the basis of the agreement between Yugoslavia and the UN, signed in 1952, the first facility for rehabilitation was formed in Belgrade. Its official name was "The Belgrade Center for Occupational Preparation of the Disabled". Official opening of the Center was in October 1952.

The last 60 years could be divided in following periods: from 1952 -1990; 1991 – 2000 and after 2000.

The first period (1952-1990) was the period of expansion of rehabilitation services on primary, secondary and tertiary levels. Our experts helped in organization of rehabilitation services and education in numerous countries in Africa as UN experts. In education of rehabilitation team members we were in good position: from 1923 at the School of Medicine in Belgrade Physical Therapy and Balneology had a Chair and a regular course in the curriculum of the School of Medicine. It changed later to Physical Medicine and Rehabilitation. With the help of our specialists Schools for Nurses took over the education of Physio and occupational therapists. Research was from the beginning a priority of our activities. Results of collaboration with our experts in basic research and biomedical engineering were internationally recognized and resulted in multiple research grants from USA and Europe.

The second period (1991-2000) was the period of civil war and international, not only economic, sanctions. The increase of demands for rehabilitation, because of large number of incapacitated and wounded civilians and soldiers on one side and devastated economy on the other side was a great challenge. We were deprived of any international help, international research grants, scholarships, even of publication of our articles in international journals.

The third period (from 2000 -). Efforts to overcome the lost ten years. To restore and improve the quality of our rehabilitation services by renewing our therapeutic devices, treatment protocols, improve the quality of education and legislation concerning rehabilitation. We have now in Serbia around 750 specialists of PRM, 3500 physio and occupational therapists, 10000 beds for rehabilitation on secondary and tertiary level, but these numbers alone do not guaranty quality. That is why one of our major goals all this past 13 years was to regain our positions in the international rehabilitation community because we hope that with joint effort, regional interaction, we can improve faster and better the rehabilitation services in our countries.

REHABILITATION AND BIOENGINEERING: HOW THEY MATURE TOGETHER

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The ultimate goal of the engineering implemented for rehabilitation is to improve the quality of life of subjects with sensory-motor impairment. At this point, there is no known rule which technique will work the best and the clinical studies and the feedback from the users are the only measure of the success.

In rehabilitation of movements the aim is to activate joints in a way to restore sensory and motor function as much as possible in humans with sensory-motor impairments. The biological organisms have evolved control systems to suit many of species and physiological functions, while the engineering resulted with very sophisticated methods that are appropriate to suit man-made systems. The two streams are converging in the area of rehabilitation.

This presentation proposes the integration of the two strategies. The strategies implemented in most of rehabilitation devices have so far been fairly simple, and have been developed largely in relation to the design of machines rather than to the design of nervous systems. Recent developments in bioengineering benefit from the neurophysiological findings and fast grow of computing power and are converging to those in analogous natural systems. Neurorehabilitation is where the two strategies meet. Neurorehabilitation is a method that allows the preserved structures to find their best use if appropriately trained. The intensive, task dependent training shows dramatic effects in the rehabilitation of humans with disabilities and this is facilitated with appropriate modern technology.

Neural engineering is where the ultimate successes is coming. The development of new implantable devices that interface directly the central and peripheral nervous system, strengthen by wireless communication, opens new horizons. The implanted technology and micromachining make dramatic impact and provide that has been difficult to imagine, yet the intelligent control that resembles to natural control is the link that would make this approach into an effective rehabilitation treatment.

In parallel, the current technology allows the quantified assessment. This assessment is necessary to objectively measure functional impairments and identify the biomechanical and neurophysiological changes caused by the injury or disease. This facilitates essential customization of a rehabilitation systems for specific needs of individual patients.

WHICH MEASURES OF BALANCE AND GAIT PREDICT FUNCTIONAL INDEPENDENCE AFTER INPATIENT REHABILITATION FOR ACQUIRED BRAIN INJURY?

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Introduction: Balance and walking are considered important for regaining independence after acquired brain injury (ABI), thus, considerable efforts during in-patient rehabilitation are dedicated to improving balance and gait. It is less clear, however, whether how balance and gait are related to functional independence on admission and discharge. These relationships are confounded by a selection of outcome measures used for assessing balance, gait, and independence. Thus, the goals of this study were to determine the relationship between balance, gait, and functional independence on admission and discharge, and whether balance and gait on admission can predict improvements in independence after inpatient rehabilitation for ABI.

Materials and methods: Twenty-four subjects (19 women) with ABI due to trauma (20) or hemorrhagic stroke (4) were included during a one-year period. Balance was assessed by the Trunk Control Test (TCT), Upright Equilibrium index (UPEQ), and Berg Balance Scale (BBS). Gait was assessed by walking FIM score (wFIM), self-selected gait speed (GS) manually measured over a 10-meter distance, and distance walked during 5 minutes (5minD). Functional independence was assessed by FIM, namely wFIM, motor FIM (mFIM), and total FIM (tFIM). All measures were taken by the same physical therapist on admission (18 ± 7 days post-injury) and at discharge (27 ± 22 days post-admission). Correlation and stepwise multiple regression were used for statistical analysis with adjustments for the time from onset to admission and the length of stay, as appropriate.

Results: On admission, TCT, UPEQ, BBS, GS, and 5minD positively correlated with wFIM. In univariate analyses, the gain in wFIM negatively correlated with admission UPEQ and GS, the gain in mFIM positively correlated with 5minD, as did the gain in tFIM with TCT, BBT, GS, and 10minD. In the final regression model, the gain in wFIM was best predicted by admission wFIM and 5minD ($R^2=0.57$), the gain in mFIM by admission mFIM, BBS, and 5minD ($R^2=0.82$), and the gain in tFIM by admission mFIM, BBS, and 5minD ($R^2=0.83$). Significant predictors of the gain in GS were admission tFIM and TCT ($R^2=0.43$), whereas significant predictors of the gain in 5minD were admission tFIM and BBT ($R^2=0.35$).

Conclusions: Balance and walking are related to several domains of functional independence after controlling for the time from onset to admission and the length of rehabilitation stay. Admission BBT and 5minD were the most common predictors of increase in functional independence at discharge. Balance and walking on admission better predict an increase in independence during inpatient rehabilitation than do balance and independence on admission predict improvements in walking.

Key words: balance, gait, functional independence, brain injury, stroke

DIAGNOSTIC AND PROGNOSTIC RELEVANCE OF NEUROPHYSIOLOGICAL FINDINGS IN PEDIATRIC REHABILITATION

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Introduction: In children of different age it is important timely to recognize causes of various pathological conditions. This will enable prompt and adequate inclusion of these patients into proper rehabilitation treatment. At birth most frequent pathology refers to congenital anomalies and birth trauma, while in older children neuromuscular diseases are frequently present as well as trauma associated with complications. The aim of our study was to evaluate and present diagnostic and prognostic relevance of neurophysiological findings in pediatric population for the purpose of timely induction of adequate rehabilitation program in order to achieve better functional status and improve quality of life.

Material and methods: We have evaluated children referred to University Childrens Hospital (UCH) in Belgrade for treatment due to the various pathological conditions age from 0-18 years of life. After clinical (neurological, neurosurgical, orthopedic, cardiological, urological) evaluation followed by radiology and imaging diagnostics, neurophysiological evaluation was applied. At UCH we are performing electromyography (EMG) in early days and weeks after birth, electroneurography (motor conduction velocity – MCV and sensitive conduction velocity – SCV) and evoked potentials (EP) (somatosensory - sSEP, visual - VEP and auditory - BAEP) after two months of life, according to the peripheral and central dysfunction.

Results: We have demonstrated that EMG evaluation is of great importance in estimation of peripheral motor nerve lesions degree and level particularly in early days of life in obstetrical plexus brachial lesions, radial and peroneal lesions or neuromuscular diseases. In older children, due to the disease condition and injury time, EMG was performed. EPs (sSEP, VEP, BAEP) are useful tools in estimation of dysfunctional degrees for afferent pathways and central nervous system (CNS) disorders and lesions. EPs are helpful in evaluation of coma degree and possible brain death. There is significant role of MCV and SCV evaluation in diagnostics of peripheral nerves integrity, especially in subclinical form in metabolic and oncological patients. This is valuable in preventing further progression of dysfunctions and diseases course. These findings are helpful in rehabilitation treatment planning and are valuable source for recovery prognosis and follow-up over treatment course.

Conclusion: Neurophysiological evaluation is used for differential diagnostics of myopathies and neuropathies and for conditions to delineate central from peripheral neurogenic lesions. It should be underlined that different neurophysiological methods are useful in children as sensitive tools and of great importance in evaluation of presence, degree and level of dysfunction. Their findings could be used as prognostic parameters for treatment outcome or progression and for indication of other treatment methods.

Key words: neurophysiology, diagnostics, rehabilitation, children

INV – 11

CHILDREN SUFFERING FROM ACQUIRED BRAIN INJURY

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Acquired brain injury (ABI) is one of the most important causes of mortality and severe disability among children. Children with ABI can suffer from a wide number of disorders that increase their disability in various fields of functioning, impacting, as well, on their integration and full participation within their family, school and society. During the acute, post-acute and long-term settings, the role of the Physical Medicine and Rehabilitation specialist (PRM specialist) has been identified. The different settings where a PRM-specialist has to work among these patients in all phases of the recovery process are described here, during the hospital stay and after discharge in the long term, as well as in preparing for discharge. Although their presence is important in all three settings, it is during the post-acute and long-term follow-up, where PRM expertise is particularly important. An interdisciplinary team of different professionals is also necessary in order to obtain the best results and PRM specialists are well placed to lead with it.

**PHYSICAL THERAPY MODALITIES AND REHABILITATION TECHNIQUES IN THE
MANAGEMENT OF NEUROPATHIC PAIN**

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Neuropathic pain is an important problem because of its complex natural history, unclear etiology, and poor response to standard therapies. It affects the quality of life and activities of daily living in a negative way, and creates severe difficulties in both professional and personal life. It also causes psychological problems resulting in sleep disorders, anxiety and depression. There are some consequences associated with neuropathic pain like deterioration in sexual and marital life and family relationships which lead to social isolation. These problems increase over time, which in turn worsen the pain causing a vicious circle. Neuropathic pain also has a bad impact on the economy such as considerable loss in working days, disability and increasing healthcare costs. Therefore, neuropathic pain must be approached as a big health problem that have to be resolved as quickly and as efficiently as possible. The primary goals of the management of neuropathic pain are to detect the underlying cause, define the differential diagnosis and eliminate risk factors. Co-morbidities and psychosocial factors, which can be related to pain, should also be evaluated. In a well-designed multimodal management plan of neuropathic pain, physical therapy modalities such as superficial and deep heat agents, analgesic currents and laser, and rehabilitation techniques such as cognitive behavior therapy, psychotherapy, relaxation therapy, and virtual reality are also important options and should be combined with pharmacotherapy in daily practice. Pain rehabilitation techniques are gradually gaining importance in the management of neuropathic pain. The emotional component of neuropathic pain is more striking and can not be controlled by pharmacotherapy alone. Rehabilitative methods which are effective in treating pain behavior, increase overall treatment success. However, it is now early to comment on these methods due to the lack of adequate publications. We have suggested that the importance of pain rehabilitation techniques will increase in time and they will have a larger part in the management of neuropathic pain.

ASSOCIATED RISK FACTORS OF INCREASED PEAK PLANTAR PRESSURE IN A COHORT OF PERSONS WITH DIABETIC NEUROPATHIES. A TRANSVERSAL STUDY

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Introduction. Elevated peak plantar pressure (PPP) is a risk factor of foot ulceration among persons with diabetic neuropathies (PwDN) and diabetic foot.

Objectives. To detect general, structural and functional associated foot risk factors of elevated PPP, in a cohort of PwDN, with the intention to prevent diabetic foot ulcer.

Material and Methods. An observational and transversal study of a 67 PwDN sample was conducted, between 2010 and 2012, at the Department of Rehabilitation of the Hospital of Requena, Spain. Inclusive criteria were range of age between 30 and 80 years old, length of diabetes mellitus course over 5 years, Neuropathy Symptom Score over 2, Neuropathy Disability Score over 4, inability to detect a 5.07 Semmes-Weinstein 10 mg monofilament on the plantar foot over 3 areas. Exclusive criteria were plantar ulcers or previous ulcers, lower limb amputation, signals of lower limbs ischemia, impairment that might lead to other neuropathy and/or to inability to walk without assistive device on level surfaces. Evaluation of length of DM course, antropometrics, feet structure and function, including finger deformity, callus, range of movement limitation in ankle and foot, and free cadence walking with Biofoot/IBV baropodometrics system was conducted. Intervention group showed PPP over 900 Kpa in forefoot. Control group, below 900 Kpa. Intervention group participants were prescribed off-loading forefoot orthotics whenever presenting associated foot deformity, and adequate footwear, in order to decrease PPP below 900 Kpa under forefeet. Education measures regarding prevention of diabetic foot ulcer were delivered to every patient at the entrance of the study. Participants were evaluated during three-trial sessions without and with the orthotics and adequate footwear.

Results. Intervention group participants with PPP over 900 Kpa under forefeet showed finger deformity, mostly claw fingers, and hyperkeratosis under metatarsal heads significantly higher than control group. These patients showed an average reduction of 34.21 % of PPP under forefoot when using the orthotics. No participant developed plantar ulcer during this study.

Conclusions. The study confirms that structure deformity of foot is a risk factor of increased PPP among PwDN, and thus evaluation of PwDN with diabetic foot is recommendable to detect these risk factors, and that off-loading forefoot orthotics are effective to decrease PPP under forefoot. Further research is required to evaluate whether maintaining long-term PPP below 900 Kpa under forefeet, controlling results with Biofoot/IBV baropodometrics system, would contribute to avoid development of plantar ulcers among this cohort of patients.

Key words. Diabetic neuropathies, diabetic foot, ulcer prevention, baropodometrics system

NEUROMUSCULAR MANIFESTATIONS IN THE UPPER LIMB IN PATIENTS USING CANES, CRUTCHES OR WALKERS

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Walking aids (including crutches, canes and walkers) are used by patients with disability of the lower limbs to provide stability and support, to assist walking and to decrease stresses imposed on the lower limbs. Therefore, they are frequently used by patients with weakness (i.e. stroke, paraparesis, quadriparesis, myelopathy, neuropathy, myopathy and anterior horn cell diseases), pain (e.g. arthritis, avascular necrosis,...) and/or injuries (i.e. fractures, ligamentous injuries, amputations, following surgery, ..) of the lower limbs.

Walking aids provide physiological and psychological advantages that a person cannot achieve by sitting or using wheelchair mobility. The use of walking aids help people with disabilities to move around freely. Standing and walking prevent joint stiffness, avoid disuse weakness, stimulate proper bone growth, prevent osteoporosis, reduce urinary tract infections, improve blood circulation, prevent postural hypotension and reduce pressure sores. However, walking aids may cause some complications including: compression neuropathy (of the median, ulnar and radial nerves), epicondylitis of the elbow, tendinitis/tenosynovitis (at the shoulder and hand) and osteoarthritis (of the glenohumeral, acromioclavicular, elbow and hand joints).

In a study done in Alexandria University Hospitals on 53 non-diabetic walking aid users (for a period of >2 months and up to 30 years), there was increased prevalence of shoulder pain, elbow pain, hand pain, epicondylitis, osteoarthritis of the acromioclavicular joint and carpal tunnel syndrome among walking aid users compared to a control group (of non-diabetic non-walking aid users of matching age, sex and occupation). Also, osteoarthritis of the 1st carpometacarpal joint was more common among unilateral crutch users than among those using the walking aid by both hands (i.e. in bilateral crutch users and in those using walkers). Besides, these complications were more common among ladies than men. Also, these complications were common among those with increased body weight, those with longer duration of walking aid use and those having a walking aid of inappropriate length.

Therefore, it seems that some of these complications could be prevented by prescribing the appropriate walking aid for each patient (regarding its type and length); reducing the patient body weight; and training the patient for using it. The physiatrist should be aware about these complications not only to prevent it, but also to diagnose and treat it early.

REHABILITATION OF PERSONS FOLLOWING UPPER LIMB AMPUTATION

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Rehabilitation of people following an upper limb amputation has to start immediately after the injury or in cases of planned surgeries even before the surgery. It has to be done at all levels of human functioning, e.i. body function (desensitization, pain control, restoration of full range of movement (ROM), muscle strength) and structures (surgery and selection of amputation level, wound healing and scar management, oedema control, stump shaping, and posture), activities and participation (training of independence in basic activities of daily living (ADL) without prosthesis and with a temporary prosthesis, training of some other personally important and meaningful activities), personal (education, employment and personality) and environmental factors (drugs, prosthesis, time from the amputation to the first prosthetic fitting, adaptations of clothes and other things, utensils, cultural background, attitudes of professionals, involvement of family and other people in prosthesis selection and support of different organisations) (1, 2).

The key to successful rehabilitation of people following upper limb amputation is teamwork (3) which improves short- and long- term outcomes (4, 5). The team consists of the patient and his or her family, surgeons experienced in upper limb amputations, specialists of physical and rehabilitation medicine (PRM), nurses, occupational therapists (OTs), physiotherapists (PTs), certified prosthetist orthotist (CPOs), psychologists, social workers, vocational counsellors, and others, all with special knowledge and experience in rehabilitation of people following upper limb amputation. Recommendation B (good practice) of British guidelines for amputee and prosthetic rehabilitation is that experienced clinical counselling and psychological support should be available for all upper limb amputees (6).

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RESULTS OF THE SURVEY ON THE USE OF ICF IN EUROPEAN COUNTRIES

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Introduction: Section of Physical and Rehabilitation Medicine (PRM) is one of 39 sections of UEMS (European Union of Medical Specialists). ICF (International Classification of Functioning, Disability and Health) was approved by WHO in 2001 and since that time it has been target of PRM specialists for research and application in clinical practice. Its principles were also included in the “White book of PRM in Europe”, published in 2006-7. In March 2012 the suggestion was approved by PRM section to prepare survey about the use of ICF in separate European countries. The questionnaire was distributed in April 2012 and answers came afterwards.

Materials and methods: Questionnaire included 19 questions. All respondents were delegates of their countries in PRM section; therefore their answers should give reliable information, though subjective bias is not fully excluded. Unclear answers were later individually discussed.

Results: Delegates of 36 countries answered. 33 of them sent filled questionnaire. In 3 countries ICF is not used. English original was translated to 25 other European languages and mostly published as a book in years 2001 – 2010, maximum in 2004. It is commonly used for evaluation in the health care only in 8 countries, and even there with limitation. It is more often used in PRM departments. Evaluation is done mostly by physicians (in 27 countries), partially also by other medical specialists: physiotherapists in 18 countries, occupational therapists in 16 countries. ICF is used for evaluation also outside of health care, in social services in 15 countries, in schools in 7 countries and in vocational rehabilitation in 15 countries. Also simplified versions of ICF are known: ICF check list is used in 15 countries, ICF core sets for different health conditions are known in 14 countries and together 18 core sets were named, most common is core set for stroke. In 10 countries exists a document, which makes the use of ICF compulsory, but it does not exist in 22 countries. In 22 countries are organized courses of ICF use. Research about application of ICF has been realised in 21 countries.

Conclusions: Our survey shows, how much work was done for translation of ICF to native languages, in the research and during its clinical application. It demonstrates large difference between European countries. During all last 12 years effort was done to modify and simplify it. This work continues through the activity of ICF Revision Steering Group of WHO. Our results show, that not all this effort was transferred into clinical practice to improve the quality of medical care. It demonstrates also example of ICF core sets, which are not generally used. Translation of ICF to different languages could be also the basis for unification of terminology in PRM.

Key words: International classification of functioning (ICF), ICF core sets, European Section of Physical and Rehabilitation Medicine

ADVANCE IN PRM DIAGNOSTIC

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In recent time polymorphism and genetic diagnostic is very popular.

This kind of diagnostic now is also in the point of interest in rheumatoid arthritis, osteoarthritis, enclosing spondylitis, in progression of joint damage in rheumatoid arthritis even in low back pain.

This kind of diagnostic could mark a patient with predisposition of this kind of disease and we in PRM now could not only treat patients with clinical signs of diseases, but also we can do in primary and secondary prevention. This kind of diagnostic also is useful in genetic treatment with biological therapy.

Despite of this sophisticated and very expensive diagnostic we do not do as we can diagnostic in neuromuscular ultrasound.

Neuromuscular ultrasound is non invasive diagnostic procedure which is can help for diagnostic or differential diagnostic in lesion of peripheral nerves, muscle, brachial plexus motor neuron diseases myopathies be helpful in interventional procedures.

BRAIN CONTROL OF ASSISTIVE DEVICESMirjana Popović¹, Savić A^{1,2}¹School of Electrical Engineering, Belgrade University, Serbia; ²Tecnalia Serbia DOO, Belgrade, Serbia

Introduction: Brain Computer Interface (BCI) systems can translate particular thoughts into the control signals of the device/computer. Various mental tasks or external stimuli induce changes in the spontaneous neural activity which can be identified by measuring brain signals. Intention is, thus, directly assessed without common output pathways of the spinal and peripheral motor system. As a result BCI may guide traditional bodily effectors such as keyboard/mouse, wheelchair, prosthetic arms or exoskeleton. When BCI users are provided with information on their performance, they have an opportunity to further modulate the brain activity in order to gain better control of the system – *neurofeedback*.

Originally, the target populations of BCI were the patients with severe neuromuscular disabilities; however, with recent advances in BCI technology, the range of applications of such systems has expanded to four main areas: communication and control, motor substitution, motor recovery and entertainment. Monitoring, analyzing and decoding brain activity of BCI user online may serve in more broader and more general sense as a new tool to better understand brain functions.

Invasive/noninvasive BCI: Invasive, as well as non-invasive brain recordings are available for BCI systems. Spike trains from single neurons, or extracellular recordings by multi-field arrays (probes) provide focused metrics of brain activity, uncontaminated by bio-electric signals outside the brain. For example, Local Field Potential (LFP) from neuronal populations in the motor cortex of primates has been used to predict arm movements and to control a prosthetic arm. The drawback of such systems is diminished precision because activity coming from only small number of brain regions is recorded. Electrocorticography (ECoG), on the other hand, measures wider brain activity from brain surface with a grid (around 20 cm²) over a lobe. The most common technique, electroencephalography (EEG), acquires brain activity over scalp in noninvasive manner. EEG measures voltage changes on the scalp due to electrical brain activity. The limitation of EEG for BCI application is its low spatial resolution (1 cm). BCIs may operate through brain signals such as event-related brain potentials (ERPs), Magnetoencephalography (MEG), real-time functional Magnetic Resonance Imaging (fMRI) and Near Infrared Spectroscopy (NIRS). Although semi-invasive, in the current state of the art, ECoG are favorable for BCI applications.

In the recent classification of BCI devices, active or passive BCIs are recognized, depending on whether the control of the system is voluntary or involuntary. Examples of passive BCIs are EEG based lie detector or drowsiness detector for drivers, which operate without or in spite of the subjects' will.

Main strategies in BCIs for rehabilitation: One approach is to use assistive or substitutive strategies, which are technologies and modalities used to bypass an interrupted neural pathway or connection. In these cases BCI technology promotes limb movement or/and muscular activation by means of neuroprotheses (functional electrical stimulation devices) or robotic control to perform daily living activities. No direct and specific motor function recovery is promoted explicitly because the cortical activity is used only to operate an external device. In cases of permanent injury, such as SCI, this may be one of the few possible alternatives. The second strategy uses a classical conditioning approach, attempting to promote neuroplasticity and consequently motor functional recovery. This strategy provides a *neurofeedback* training process to modulate the specific cortical activity in the affected brain region. It is based on coupling a conditioned stimulus and an unconditioned stimulus attached to a response in a Habbian manner to produce neural plasticity. For successful BCI adaptation it is necessary that using BCI is easy and with known accuracy.

Key words: Brain Computer Interface, assistive devices, EEG, neurofeedback, neuroplasticity

INTRATHECAL BACLOFEN THERAPY FOR TREATMENT OF CNS SPASTICITY

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Introduction: In some patients severe spasticity of cerebral or spinal origin can not be treated successfully with conventional oral medication or physical modalities. Intrathecal baclofen therapy with implanted pump represents effective treatment from mid-80's. Baclofen (Lioresal) is a muscle relaxant and potent GABA agonist that acts via GABAB receptors at the posterior columns of spinal cord level, to inhibit the release of excitatory neurotransmitters by inhibiting calcium ions influx into presynaptic terminals. This direct binding on spinal cord receptors leads to higher efficiency compared to peroral therapy in which baclofen does not pass the brain-blood barrier. Intrathecal Baclofen Therapy (ITB) involves the long term delivery of Baclofen to the intrathecal space surrounding the spinal cord for the purposes of relieving severe spasticity. This delivery method of Baclofen is used when oral medication or conventional physical therapy no longer manages the spasticity sufficiently, and the spasticity has an impact on the quality of life of the patient.

The benefits of ITB to the patient are well documented, and typically reduce muscle spasms, tone and pain. This in turn increases mobility, independence, stamina, sleep and an overall increased quality of life. In addition to the patient benefits, there is also a reduced workload for care by patient caregivers and family members.

Since ITB therapy, as a part of broader neuromodulation therapy, is regarded as functional treatment, interdisciplinary approach is necessary for building a successful center and achieving a long term therapeutic goals. As rehabilitation medicine specialist is only holistic oriented specialist, with knowledge of functional assessment, it is recommended that therapeutic process is coordinated by the PRM specialist.

Key words: Intrathecal baclofen pump, spasticity, central nervous system lesion, rehabilitation

REHABILITATION OF PARKINSON'S DISEASE. EVIDENCE BASED CONCLUSIONS

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INTRODUCTION: Parkinson's disease (PD) is a progressive neurodegenerative disorder with many negative effects on patients and their families. Physiotherapist is a member of multidisciplinary team in treatment of PD with the aim to maximize functional ability and reducing secondary complications. This is achieved through education and support for movement rehabilitation.

METHODS: Search and analyse of review studies published in Pubmed was performed, and statistical data were evaluated.

RESULTS: According to review studies it seems that: Benefit for physiotherapy in PD was found in most outcomes over the short-term, but was only significant for velocity, two- or six-minute walk test, step length, Timed Up & Go, Functional Reach Test, Berg Balance Scale and clinician-rated UPDRS. Most of the differences were small. But for some outcomes (e.g. velocity, Berg Balance Scale and UPDRS), the differences observed were at, or approaching, what are considered minimally clinically important changes.

CONCLUSION: Further implications are: There is a need to develop a consensus as to 'best-practice'. Large well designed placebo-controlled RCTs are then needed to demonstrate the efficacy and effectiveness of 'best practice' physiotherapy in Parkinson's disease. The stage of the disease at which the physiotherapy is given should be specified at the outset. Outcome measures with particular relevance to patients, carers, physiotherapists and physicians should be chosen and the patients monitored for at least six months to determine the duration of any beneficial effects.

Key words: Parkinson's disease, physiotherapy, review

NEW TRENDS IN REHABILITATION OF PATIENTS WITH PARKINSON'S DISEASEMirko M Grajić^{1,2}, Lazović PM³, Kostić SV^{1,4}¹School of Medicine, University of Belgrade, ²Physical and rehabilitation medicine clinic, Clinical Center of Serbia, ³Institute for rehabilitation, ⁴Neurology Clinic, Clinical Center of Serbia, Belgrade, Serbia

Introduction: During the progression of PD, mobility is progressively constrained by rigidity, bradykinesia, freezing, sensory integration, inflexible motor program selection and attention and cognition. They experience difficulty in modulating gait parameters in response to tasks demanding changes. Mobility requires dynamic neural control to quickly and effectively adapt locomotion, balance and postural transitions to changing environmental and task condition. While the pharmacological treatment of Parkinson disease is essential, many systematic reviews have reported positive effects of physiotherapy and exercise as rehabilitation technics on the motor and non motor signs and symptoms of PD. Recent studies suggesting that exercise may exert neuroprotection, slow, stop or reverse the neurodegenerative process and promote neurorestoration, adaptation of compromised signaling pathways. The inability to simultaneously carry out a cognitive task and a balance or walking task has been found to be a predictor of falls in elderly people.

Materials and methods: Data analyze of the research studies and reviews of the literature available on the NLM Pub Med, Medline, Current Contents databases and the first results of systematically structured performed physical rehabilitation treatment (PRT) of inpatient patients in Neurology Clinic of Clinical Center of Serbia.

Results: Parkinsonian Rats that ran on a treadmill showed preservation of dopaminergic cell bodies and terminals associated with improved running distance and speed. Cohen demonstrated that a potent neurotrophic factor for the survival of DA neurons, glial cell line-derived neurotrophic factor (GDNF), was upregulated in the striatum corresponding to the exercised limb. Exercise has been shown to induce generation of GDNF producing cells (glia) in the substantia nigra DA cells period of inactivity or stress may reverse the protection and behavioral benefits of exercise. Decreased physical activity, which is often a precursor of the diagnosis of PD and worsened by the symptoms of bradykinesia, fatigue or weakness, may be prodegenerative. Tillerson revealed that inactivity is not only a symptom of PD, but a catalyst in the degenerative process. Rehabilitation aim in PD is ability to quickly switch motor programs when environmental conditions change, and the ability to maintain safe mobility during multiple motor and cognitive tasks. Specific rehabilitation treatment recommendations included: cueing strategies to improve gait and reducing possibility of fall; cognitive movement strategies to improve transfers; exercise to improve balance; training of joint mobility and muscle power to improve physical capacity. Rehabilitation should include complex, multisegmental, whole-body movements and tasks requiring quick selection and sequencing of motor programs such as practicing postural transitions (e.g., moving from stance to the floor, rolling, and arising from the floor to stance). Cognitive Constraints and Task-specific exercises-progress task difficulty by adding cognitive or motor tasks that teach patients with PD to maintain postural stability during performance of secondary tasks. Repetitive transcranial magnetic stimulation (rTMS) of the brain has been shown to modulate cortical excitability. Combinations of rehabilitation therapies with rTMS might enhance the therapeutic effects. The new findings suggested that combination of rTMS and treadmill training enhances the effect of treadmill training on modulation of corticomotor inhibition and improvement of walking performance in those with PD.

Conclusions: New neurorehabilitation approach routed towards highly individualized structured combined rehabilitation program which include gait diagnostic and gait rehabilitation, cardio metabolic assessment with energy costs calculations, protocols of aerobic and resistant and range of motion training and specific functional aims defined by functional limits every specific patient. Over the time rehabilitation includes progressive levels of sensorimotor, resistance, and coordination challenges that can be costumed for each patient.

Key words: new trends, rehabilitation, Parkinson's Disease

URODYNAMICS AS AN USEFUL TOOL IN EVALUATION AND PROGNOSIS OF CLINICAL SIGNS AND SYMPTOMES OF OCCULT SPYNAL DYSRAPHISM

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Introduction: Spina bifida occulta (SBO) is characterized with wide entity of spine anomalies and neurological impairments, among them voiding dysfunction. Beside dysphunctional voiding these children present with incontinence, enuresis or constipation. Voiding dysphunction could be the only sign of SBO, but often such pathology could be associated with other symptoms that are related to SBO. The purpose of this study is to evaluate the importance of urodynamic findings in early detection of SBO complications as well as its role in prognosis and treatment of children with dysfunctional voiding.

Material and methods: We evaluated 140 children with SBO age between 4-14 years that were hospitalized and treated at University Children's Hospital in Belgrade. All participants were divided into 3 groups: First group composed 40 patients with dysphunctional voiding without apparent symptomatology related to SBO. Second group composed 60 patients with dysphunctional voiding and present stigmata (hyperthrihosis, fovea spinalis, gluteal line asymmetry, hipo/hyperpigmentation, lipoma). Third group composed 40 patients with present stigmata and clinically verified locomotor deformity (hip, foot, spine). Entire study group underwent urodynamic evaluation. Furhter parameters were analyzed: frequency, urgency, detrusor sphincter dyssinergy, rezidual urine.

Results: There is significant statistical correlation between dysphunctional voigind and presence of stigmata in SBO patients with clinical symptoms progression (tethered cord syndrome, deformity on locomotor system) ($p < 0.05$). In patients with present stigmata in higher proportion was noticed the existence of dysphunctional voiding as well as SBO. Patients with isolated symptom of dysphunctional voiding did not show significant presence of SBO ($p > 0.05$).

Conclusion: We have demonstrated that urodynamics could be usefull tool in diagnosis and prognosis of SBO and dysphunctional voiding in children. Parameters gained by urodynamic evaluation could be useful in determination of bladder type dysphunction (hypotonic and hypertonic) enabling timely and adequate introduction of physical therapy and medical treatment.

Key words: spina bifida occulta; urodynamics; voiding dysphunction; children

SCOLIOSIS AND SPORTS

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Introduction. Scoliosis is a general term comprising a heterogeneous group of conditions consisting in changes in the shape and position of the spine, thorax and trunk with prevalence of up to 2% (3%) of the population. It can be defined as a “three -dimensional torsional deformity of the spine and trunk”. Scoliosis can become more pronounced during the growth and development, especially in school children, under the influence of various internal and external factors. “Structural scoliosis” must be differentiated from “functional scoliosis”, that is a spinal curvature secondary to known extraspinal causes. It is usually partially reduced or completely subsides after the underlying cause is eliminated. Idiopathic scoliosis is a structural and lateral curvature of the spine for which a currently recognizable cause has not been found and there is no basic evidence for physical and radiographic pathology.

Complications. Untreated adolescent idiopathic scoliosis can progress and result in back pain, impaired lung capacity and psychosocial disorders due to the cosmetic appearance of the deformed trunk. Over the long term, patients suffer impairment of their sports activities compared with age-matched controls.

Physical and sports activities. There are different results in literature about the effect that various sports can have on the prevalence of scoliosis in children. Sports have often been considered to be a causative factor of musculoskeletal perturbation, or on the other hand are recommended as a treatment option for adolescent athletes who are engaged in certain athletic activities. The various sports, in addition to positive, have a negative influence on the musculoskeletal system with appearance of various disturbances. Scoliosis has been found in one study in up to 80% of athletes with an asymmetric load on the trunk and shoulders, such as javelin throwers and tennis players. The patients with scoliosis should be encouraged to actively take part in sports activities. It is reported that children who were not actively involved in sports activities had significantly higher probability of poor posture than children performing sports. Several studies suggest that systematic exercising and participating in sports activities is probably not associated with the development of scoliosis. Potential association between elite-level competition in specific sports at an early age and an increased prevalence of scoliosis has been reported (grade C recommendation). Positive influences on the general fitness including the lung function, strengthening of the trunk muscles and on the psyche can be expected.

SOSORT recommendations. Sports are recommended because of the specific benefits they offer to patients in terms of psychological, neuromotor and general organic well-being. During all treatment phases, physical education at school is continued. Sports activities are continued also during brace treatment and restrictions may be placed on practicing certain types of sports activities. During brace treatment, contact or highly dynamic sport activities are performed with caution and competitive activities that greatly mobilize the spine are avoided in patients with scoliosis at high risk of progression.

DOES PHYSICAL THERAPY HAVE ANY EFFECT ON DISEASE ACTIVITY OF RHEUMATOID ARTHRITIS?

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Drug therapy is the only treatment that has an effect on the activity of rheumatoid arthritis (RA). On the other hand, as a generally accepted opinion, drug therapy and physical therapy (PT) affect functional ability. There are no studies that tell about the possibilities that PT decrease inflammation, but there are many that prove that drug therapy, without PT can increase functional ability. Can this be objected? It can, but it must be documented by quality studies.

The aim of this study was to examine the validity of widely accepted claims. The main characteristic of RA is symmetrical pain, swelling and limitation of movement. Swelling is the result of increased amount of synovial fluid, which is a consequence of inflammatory activity. Joint pain develops due to stretching of joint capsule that is rich in sensitive fibers. Measure of disease activity are painful and swollen joints, the parameters of the acute response (SR or CRP) and evaluation of patient's general condition using a visual analog scale (VAS), all of which becomes part of the disease activity score (DAS or DAS 28)¹. It is a joint clinical index of RA activity, which indicates the current disease activity². Today, each study that examines the effect of different drugs as a measure of RA activity use DAS. Although each study has a number of exclusionary criteria that has an aim to provide objective research, i.e. to exclude any doubt that achieved reduction in DAS score is exactly the effect of the examined drug.

Never excluding criterion was the use of PT during the study, suggesting that the researchers do not give any importance to its effect on pain and swelling in patients with RA. Physiatrists have known for a long time that the PT does not achieve only increase in range of motion and muscle strength, but also there is a significant reduction in pain and swelling of the joints, but sadly it is not published. For this purpose, a study has been done at the Department of physical medicine and rehabilitation in Tuzla with the aim to determine the effect of PT on DAS 28 (with 28 joints)³. It showed that there was a significant reduction in the number of painful and swollen joints, as well as of patient's evaluation of disease activity. Sedimentation rate is reduced, but not significantly. There was a significant reduction in DAS 28 of 1.2 ($p < 0,0001$). This represents moderate therapeutic effect and definitely not an insignificant effect of FT.

Conclusion: If DAS 28 is measure of RA activity, and physical therapy can reduce the DAS 28, then it means that it can affect the reduction of disease activity.

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PEDOBAROGRAFIJA U PREVENCIJI I TRETMANU SINDROMA PRENAPREZANJA

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Sindromi prenaprezanja su čest klinički problem u CBR centrima, populacija koja je najčešće zastupljena su sportaši i rekreativni sportisti. Najčešći sindrom prenaprezanja stopala su: tendinitis, enthensitis prednjeg tibialnog mišića, plantarni fascitis, sindrom prenaprezanja Ahilove tetive, prelomi zamora metatarzalnih kostiju, tendinitis drugog fleksora palca.

Najznačajniji etiološki faktori su poremećaj biomehanike stopala u smislu njegove statičke i dinamičke funkcije. Pedobarografija kao nova dijagnostička metoda pomaže kompjuterskoj dijagnostici stopala hodom po platformi gdje se mjeri plantarni pritisak pomoću tri senzora po kvadratnom centrimetru ploče. Na osnovu dijagnostike u smislu pedobarografije se u kombinaciji sistema CAD (Computer Assisted Design) konstruiše uložak koji se pomoću robot mašine i CAM programa (Computer Assisted Machine) izrađuje na savremen način. Ortopedski ulošci urađeni na ovaj način mogu prevenirati i liječiti mnogobrojne sindrome prenaprezanja u području stopala i cijelog donjeg ekstremiteta. Tvrdoca i vrsta materijalna ortopedskih uložaka biraju se na osnovu kliničke slike, nalaza pedobarografije i zahtjeva za rasterećenje pojedinih dijelova stopala. Ortopedski ulošci za sport se izrađuju od mekših i elastičnih materijala, a vrsta materijala bira se individualno zavisno od tjelesne mase sportiste, tegoba i vrsta sporta.

Stopalo je izloženo velikim statičkim i dinamičkim silama opterećenja koje dovedu do nesklada snage muskulature i opterećenja, te se javljaju sindromi prenaprezanja.

Nova tehnologija, izrada ortopedskih uložaka i pedobarografija omogućavaju sprečavanje i smanjenje tegoba, a u okviru sporta su jedan od važnih karika za postizanje boljih rezultata.

Ključne riječi: sindrom prenaprezanja, sportska rehabilitacija, pedobarografija

A MULTIDISCIPLINARY APPROACH IN GLUCOCORTICOID - INDUCED OSTEOPOROSIS

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Glucocorticoids accelerate resorption and inhibiting bone formation, decrease intestinal calcium absorption, increase renal calcium excretion, induce secondary osteoporosis and increases the risk of fracture. Vertebral fractures may occur in as many as 30 – 50% of patients receiving chronic glucocorticoid therapy. A higher fracture risk category should be considered: 1.high daily dose of glucocorticoid, 2.high cumulative glucocorticoid dose, 3.declining bone mineral density on serial dual-energy x-ray absorptiometry (DXA). Physical activity in the treatment of osteoporosis requires a multidisciplinary approach, including medicament and physical therapy. Recommendations for counseling now include fall risk assessment, height measurement, 25-hydroxyvitamin D measurement, and evaluation of patients for prevalent and incident fractures using vertebral fracture assessment by DXA or radiographic imaging of the spine. Recommended drugs include teriparatide and zoledronic acid, while estrogen and testosterone are no longer recommended as therapies for glucocorticoid-induced osteoporosis. Bisphosphonates are not included because of concern for the potential long-term side effects of these medications.

Key words: osteoporosis, glucocorticoids, prevention, therapy

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WHICH EVIDENCE IS NEEDED FOR THE RESEARCH IN REHABILITATION

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In medicine, evidence, composed of information from research considered to be methodologically valid as well as randomized trials (RCTs) used to evaluate the effectiveness of a new drug, represents the factor used to make any clinical decisions for each new patient. In rehabilitative medicine, due to the specific “practical” nature of the theoretical assumptions coming from different hard sciences, evidence can only be considered within a continuous and firm connection with the evolution of knowledge supplied by different scientific disciplines, not just medicine (neurophysiology, philosophy, psychology, neuroimaging, etc.), which allows us to abandon practical views should they prove to have no theoretical foundation. Consider, for example, the “emergentist” studies during the last century, conducted by scientists and philosophers of science, which undermine the myth of objectivity and of gradual development of knowledge, according to a constructivist epistemology where the observer and his theories are within his own descriptions, or the decline of behaviourism and the growth of cognitive psychology with the consequent need to approach in a new way ideas such as consciousness, motor imagery, the physical self and intention, which must enter the world of rehabilitation in a stable way. In this sense exercise, as an “experience” designed with specific therapeutic purposes, if consistently deriving from the theoretical principles referenced and if its effects can be measured, can represent, in relation to success or failure, confirmation or testing of the theoretical model, thereby acquiring a strong epistemological value for research and verification of theoretical assumptions. Rehabilitation, the meeting ground of theoretical assumptions and complex methodologies can therefore take pride in presenting itself today as a propelling element of a process of redefinition of medical and biological knowledge and perhaps more generally, of the “scientific ideal” itself.

NARRATIVE BASED REHABILITATION MEDICINE: A NOVEL APPROACH FOR THE REHABILITATION PROGRAMS

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The Evidence Based Medicine has been a step forward to improve the quality and the appropriateness of the medical practice. A limitation of this approach is that it consider the effect on whole population without consider the single person. Rehabilitation Medicine is an approach devoted to the whole person not to a single apparatus and it is difficult to obtain evidence of the efficacy of the interventions. Since the rehabilitation program is aimed to personalise specific goals related to the need of the person a novel approach is necessary¹. The narrative medicine is a novel approach focus in recording the perspective of the patient relate to his disease with the attempt to understand his need and personalise the clinical approach². In Rehabilitation this method is very peculiar as allow, starting from the narration of the patient, the personalization of the goal of the patients himself and define specific goals in the rehabilitation program. Starting from the narrative approach is possible to identify the most critical areas of rehabilitation, using the narration through ICF (International Classification of Functioning, Disability and Health), to create a targeted rehabilitation programs³.

In the attempt to practically apply this new approach we recruited patients resident in Umbria, Italy, living in their own home with a diagnosis of Amyotrophic Lateral Sclerosis (ALS) who were monitored from March to September 2011. The following factors were considered: age, gender, type of illness and time to diagnosis. For each patient we spent about 1 hour and half collecting the narration of illness using ICF items. The areas evaluated were: communication, travel, personal care and interaction with people, daily activities and social life. To assess the functioning of patients we used 19 ICF items taken from the questionnaire WHO DAS 2 2000, assigning a score from 0 to 4 for capacity and performance, when these were completed a statistical analysis of the collected data was carried out.

Results: We recruited 20 patients with ALS (12 males and 8 females), with a median age of 65 years (range 42-80 years) with different ALS forms at various stages of the disease. The follow up time was 1291.75 days (range 60-5170). The disability areas were: "Remunerative employment" and "doing housework" (mean score 3.85), "dressing" and "washing" (average score 3.6). The items performance using facilitators were: "wash"(100%), "dress"(100%), "sit down"(80%), "move around the house"(70%), "eating"(60%), "move to different locations"(60%), while performance was essentially unchanged in the items: "paid employment" (5%), "economic life" (5%), "managing tension" (10%), "life in the community" (25%), "doing housework" (25%).

Discussion: Different types of narrative were identified. Narrative interviews allow an understanding of living with ALS and highlight the most critical problems that need solving in order to live life as well as possible through keeping active and engaged in life. The facilitators make a difference in the areas of movement and personal care while performance is lower in daily activities and social life. Narrative Medicine and ICF can highlight the critical issues, which will need more attention with a targeted rehabilitation project.

The EBM and Narrative approach are not alternatives but integrative as the reflect the to see Three circles of EBM. Clinical evidence explore the known and unknown. Clinical circumstances integrate the universal and particular. Patients' values speak to both body and self².

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THE REHABILITATION KNOWLEDGE OF PHYSICIANS AND MEDICAL STUDENTS IN HUNGARY

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Background: Physical and Rehabilitation Medicine is recognized as a specialty in its own right, and has a fifty-year long history in Hungary. There are some 30 000 physicians working in the Hungarian health-care system, and more than 300 of them are specialized in PRM. Fifteen trainees pro year are getting ready for practicing PRM specialty. In Hungary, there is a capacity of ca. 6000 inpatient beds available for the rehabilitation of patients with neuro-musculo-skeletal disabilities (Hungary has 10.000.000 inhabitants, 60 000 hospital beds, national health services and mandatory health insurance). Two of the four Medical Universities in Hungary have rehabilitation departments, and there is a gradual education program at all four universities.

The rehabilitation knowledge of physicians - in our experience - is at medium-level. The aim of our investigation was to assess the rehabilitation knowledge of physicians in a general hospital, of rehabilitation trainees during education, and of final year medical students.

Methods: In 2012, we devised a paper-and-pencil survey: a questionnaire with seven multiple choice questions, and three definitions. Questionnaires were filled in independently, and immediately right on the spot. The three answering groups were: physicians (specialized in orthopedic surgery, neurology or neurosurgery) in a general hospital with rehabilitation ward, final year medical students from Semmelweis Medical University, and trainees in rehabilitation medicine. Filling out the questionnaire was voluntary and anonymous.

Results: Forty physicians, 42 students and 39 rehabilitation trainees filled in the questionnaire. Half of the students gave correct answers to questions about rehabilitation specialization, about existing university chairs, about the number of people with disabilities in Hungary, and about the responsibility for referring patients to rehabilitation consultation. The numbers of beds for rehabilitation purposes was unknown, but the legal rights of and regulations relating to people with disabilities was well-known by all groups. Almost nobody was able, however, to define the basic categories (rehabilitation, disability). Rehabilitation knowledge of physicians was not better than that of students, whereas rehabilitation trainees were more informed.

Conclusions: According to our research, students and physicians do not have enough knowledge of rehabilitation to adequately perform medical interventions in Hungary. The extension of the medical curriculum to encompass basic rehabilitation knowledge is suggested. A training course in rehabilitation seems necessary for physicians to be better equipped to carry out their daily hospital work.

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CARDIAC REHABILITATION AFTER MYOCARDIAL INFARCTION IN ELDERLY

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CR is a cost-effective intervention following an acute coronary event, since it improves prognosis by reducing recurrent hospitalization and health care expenditures, while prolonging life. The term cardiac rehabilitation (CR) refers to coordinated, multifaceted interventions designed to optimize a cardiac patient's physical, psychological, and social functioning, in addition to stabilizing, slowing, or even reversing the progression of the underlying atherosclerotic processes, thereby reducing morbidity and mortality. CR programs are recommended (Class I) by the European Society of Cardiology (ESC), American Heart Association (AHA), and American College of Cardiology (ACC) in the treatment of patients with acute coronary syndrome (ACS).

Although, in the early years people over 65 years of age were excluded from rehabilitation programs, now they are in a growing percentage in the rehabilitation centers. Because of significant anatomical severity of coronary artery disease, increased risk of complications and a significant presence of co-morbidities in the elderly, length of hospital stay is almost twice as long compared to younger patients, and it includes extended hospitalization and limitations in physical activity. Even in the period preceding an acute coronary event, the intensity of physical activity is reduced due to the state musculoskeletal system, associated diseases, reduced muscle mass and muscle strength, anxiety, depression, loss of motivation.

Benefits of exercise training are in increasing the working capacity, decreasing in dependence, thus leading to improved quality of life. Improvement of neuromuscular coordination, flexibility, joint mobility, stability, strength and muscle tone, reduces the risk of injuries and falls. It also reduces the occurrence of bone demineralization and consequential osteoporotic fracture, which is particularly important for women. Along with weight control, mental relaxation, self-confidence and reducing anxiety and depression, this training reduces or modifies coronary risk.

Aerobic activity should begin with the low level load of 3 to 4 METS, the increase in intensity and duration should be gradual. Plan of physical exercise should be made after the evaluation exercise test if angina or ischemic changes, silent ischemia, or dyspnea, which is the equivalent of angina in the elderly population, did not occur at the test. Initial load is performed to achieve 40% to 60% heart rate that was achieved on the test load, with a progressive increase in the range of 60 to 75%.

Modern cardiac rehabilitation should be comprehensive, initiated as early as possible, continuous, staged, individualized depending on the clinical state and acceptable for the patient.

VIBRATION ENERGY IN REHABILITATION MEDICINE

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In Medicine Vibration energy can be used both diagnostically and therapeutically.

In Diagnosis Vibration Energy and sEMG can help to test functional instability of the knee after a trauma, or to evaluate hamstring muscle lesions in athletes.

In Reeducational Motor Program Therapeutic Exercise can be executed in normogravity, microgravity, and hypergravity-like conditions.

Therapeutic exercise in normogravity condition (TENG) is made by the patient using free motion or resistance motion in normal gravity field (1g). It means moving the body by the normal air, usually in gyms. *Therapeutic exercise in Microgravity condition (TEMG)* is executed by the patient using free motion or resistance motion in lesser gravity field (acceleration < 1g); it means moving in water or in special tools with partial body weight support. *Therapeutic exercise in hypergravity-like condition (TEHG)* is made by the patient using free motion or resistance motion in higher gravity field (acceleration > 1g); it means moving during supplementation of vibration energy (TEVE).

TEHG is a recent modality of exercise. We can realize it by TEVE. It consists in isotonic and isometric contractions of muscles, enhanced by vibration energy. TEVE is gradually becoming important: this is the product of sinusoidal vibration that elicits tonic vibration reflex, enhancing muscle contraction. TEVE can be used for ameliorating the flexibility; this target exercise can gain range of motion, solve postural problems, and cure focal muscle strains. Vibration exercise can increase proprioception drivers to fast regain drill and coordination after traumatic lesions.

The possible clinical applications are the followings:

Osteopenia, postmenopausal osteoporosis and non union fractures; muscular hypotrophy and hyposthenia, after PNS or osteo-mio-articular lesions or after ortho-surgical treatments; muscle retractions and shortenings, in ROM limitations, postural defects, and muscle lesions; proprioceptive deficits, in balance disorders, or after orthopaedic surgery, and in RSDS.

Actually vibration application on patient needs a severe control by Physician, and a precise and warning application by PTs. Nowadays many experimental studies in this field are going to be published, but the actual knowledge let to see an interesting future for TEVE in Rehabilitation Medicine.

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**EFFICACY OF EXTRACORPOREAL FOCUSED SHOCK WAVES THERAPY IN PATIENTS
WITH CHRONIC PLANTAR FASCIITIS**

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Introduction: Plantar fasciitis is the most common cause of heel pain, it has been estimated that up to 10% of the population will get it in their lifetime. Extracorporeal focused shock wave therapy (ESWT) is increasingly used for plantar fasciitis, but limited evidences support its use.

This study is aimed to evaluate whether ESWT reduces pain and improves function in patients with plantar fasciitis.

Materials and methods: We recruited all consecutive patients suffering from chronic pain due to plantar fasciitis (at least 6 months) who were previously treated with drug therapy without achieving significant results in terms of improvement in pain symptoms. They were evaluated using the “Brief Pain Inventory” (BPI) and Visual Analogic Scale (VAS) before (T0) and after 4 sessions of ESWT (T1). The energy was applied in four sessions – once a week- over a range between 0.13 and 0.33 mJ / mm², without application of local anesthetics.

Results: At the end of the study we collected data about 60 patients (33 M and 27 F, mean age 58.1, mean BMI 26.15). The mean BPI pain severity index was 7.16 at T0 and 1.33 at T1 (p<.000), the mean BPI pain interference index was 6.43 at T0 and 0.83 at T1 (p<.000); the mean VAS score was 7.23 at T0 and 2.14 at T1 (p<.000).

Conclusions: In our study we found a clinical and statistical significant reduction of pain and a clinical and statistical significant improvement in the quality of life, measured with the BPI. Therefore we can conclude that Focused Shock Wave Therapy is a safe and effective treatment for plantar fasciitis.

EXTRACORPOREAL SHOCK WAVE THERAPY IN THE TREATMENT OF CHRONIC TENDINOPATHIES AND OSTEOARTHRITIS

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Introduction: Originally used for the desintegration of kidney stones shock wave therapy became a treatment of choice in patients with chronic orthopaedic disorders in the last years. Its application in musculoskeletal disorders began in the middle of the nineties in Germany and nowadays it has become significant subject of research worldwide.

Material and methods: The author presents the physical characteristics of focused, radial and planar shock wave therapy (SWT) and the differences between them. The physical, chemical and biological mechanisms of the beneficial effects of SWT, found in experimental and clinical studies are presented.

The evidence about the effect of SWT in chronic tendinopathies, resistant to other treatment modalities is discussed. There is good level of evidence about the effect of shock wave therapy in calcifying tendinopathy of the rotator cuff, tendinopathy of the Achilles tendon and patellar tendinopathy and moderate evidence with conflicting results about its efficiency in lateral epicondylitis of the elbow and plantar fasciitis. The treatment protocols are not unified and no precise algorithm has been accepted. The author shares own experience in achieving pain relief and functional improvement after the application of radial shock wave therapy in patients with tennis elbow and plantar fasciitis. The effect of radial shock wave therapy in the treatment of patients with osteoarthritis of the knee was studied. A hundred and seven cases with knee osteoarthritis were included in the study. They were divided into 3 groups: 1st group – treated with radial shock wave therapy, 2nd – with placebo application and 3rd – with complex physiotherapy treatment (interferential currents, low frequency pulsed magnetic field and kinesiotherapy). Clinical methods were used for the assessment of the results: ROM, manual muscle testing, VAS (10 cm) for pain at rest, during walking, ascending and descending stairs, at palpation; Knee injuries and osteoarthritis outcome score (KOOS). The assessment was made before the treatment, right after it, one month and three months later. Statistical methods: analysis of variance, Student Fisher t-test, oneway ANOVA.

Results: A statistically significant improvement in the functional scores and pain relieving effect was found in the study group after the application of RSWT, which was not observed in the placebo group. Statistically significant better results were found in the group treated with radial shock wave therapy in comparison with the group with conventional physiotherapy, regarding pain ascending and descending stairs (VAS) and KOOS.

Conclusion: The evidence about the beneficial effect of shock wave therapy in chronic tendinopathies in comparison with the vast majority of other conservative and operative methods is above average, so it could be recommended in case the proper indications are followed. The application of radial shock wave therapy in patients with knee osteoarthritis give promising results, but further studies are needed to clarify the exact mechanisms and the appropriate treatment protocol.

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PAIN ASSESSMENT AND MANAGEMENT IN ELDERLY

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Pain is an unpleasant, subjective, multifaceted, biopsychosocial experience. The prevalence of clinically significant pain in older adults is estimated at 25–50% in the community and at 45–80% in nursing homes. Non malignant pain in elderly is most frequently associated with musculoskeletal disorders, such as degenerative spine conditions and arthritis. The four most frequently reported sites of pain in older patients are the knee, hip, hand, and low back. Clinical manifestations of pain are complex and multifactorial in the older population because of medical comorbidities and physiological and cognitive changes that make pain evaluation and treatment more difficult.

Unfortunately pain in this population is mostly undiagnosed and untreated despite important fact that it is associated with a number of adverse outcomes like functional impairment, falls, mood changes, sleep and appetite disturbance, decreased socialization, and greater healthcare use and costs. Difficulties arise from widespread misunderstandings of pain and its treatment in elderly adults and in addition from underreporting of pain in large variety of personal, cultural, or psychological reasons. Detailed medical history and physical exam of geriatric pain patient especially systematic screening of each body area is a key point in defining an appropriate assessment and treatment strategy. The best indicator of the pain experience is the patient's own report. Self-report measures assessments of pain intensity (uni-dimensional pain scales) can be quickly and easily used. McGill Pain Questionnaire (MPQ) remains the most widely used for specific sensory attributes because of cross cultural reliability validity and solid discriminative capacity in different pain syndromes. The social and cultural factors contributing to pain expression could be assessed by the West Haven-Yale Multidimensional Pain Inventory (WHYMPI). Specific problem is recognizing pain experienced by patients with cognitive impairment. There is no golden standard in the assessment of pain in the elderly with cognitive impairment, but several useful behavioral assessment tools are available. Performance-based functional assessment is necessary to draw pain's impact on function.

Pain management in older adults requires a special emphasis on the needs of this population. Pain is a multifaceted problem and therapy goals are addressed to pain control, improving of function and altering of pain behaviors through an individualized approach. Multimorbidity, polypharmacy and elderly subjects' vulnerability to adverse reactions of medicines constitute a big challenge to the pharmacology treatment of pain. Evidence indicates that physical activity, occupational therapy and education can reduce pain and disability of musculoskeletal origin, without reasonable understanding of pathways from pain to disability.

However many gaps exist between patient subjective experience, report of pain, mechanisms of disability and objective information required to develop appropriate therapeutic options.

IMPORTANCE OF PHYSICAL THERAPY AND REHABILITATION IN GERIATRICS

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Aging is associated with progressive and irreversible tissue changes, with an increase in the prevalence of acute and chronic diseases, which adversely affects the functional state of the entire organism. The most common diseases of the elderly are articulated skeletal, cardiovascular, diabetes and its complications (amputation), psychiatric, neurodegenerative and cancer diseases, and they are often associated. Frequent injuries resulting from falls are bone fractures caused by osteoporosis. Physical therapy is an individualized and comprehensive program of therapy that uses various types of medical rehabilitation, in order to maintain, restore or improve the physical, psychological, medical, social, emotional, professional and economic status of the patients. In the selection of the treatment determining are the type and number as well as the degree of severity of present disease. In the elderly persons are often present two or more of the diseases, which should be taken into account when selecting the type of physical therapy. When deciding which types of physical therapy to apply it should be first assess their positive effects, possible side effects and contraindications. The main methods involve the use of physical therapy, physical training and physical activity, in the form of active and passive exercises and the use of adaptive techniques (modifications in these activities). If necessary, it will be included the assistive technology, ie. use devices such as orthotics (corsets, supports, connections, splints, raise,...) and prostheses (artificial limbs and joints). In physical therapy are also used modalities (eg, use of lasers, heating, cooling, ultrasound, magnetic and pulsed electromagnetic fields, electrical impulses, iontophoresis, hydrotherapy, massage). Applied therapy aims to improve the health and functional status, and psychological, physical and socio-economic status of patients, and in this way to improve the quality of life. It is mandatory for the successful rehabilitation also the inclusion of education and accommodation, to preserve the dignity of life, and where possible to prevent new diseases and complications, including the appearance of functional disability, and geriatric syndromes (immobility, dependence, physical instability and uncontrolled urination).

Keywords: geriatrics, physical therapy, rehabilitation

ICF CONCEPTS IN THE REHABILITATION OF BREAST CANCER PATIENTS WITH POSTMASTECTOMY LYMPHOEDEMA

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Lymphoedema is one of the frequent consequences of breast cancer surgery with axillary dissection. It is associated with psychological and physical problems resulting in impaired functioning and health related quality of life (HRQoL). Therefore, it is important to assess functioning in detail using the International Classification of Functioning, Disability and Health (ICF) and target treatments accordingly to improve HRQoL of breast cancer patients with postmastectomy lymphoedema. Recently developed and validated Lymph-ICF questionnaire assesses functioning properties in five domains including two domains in functions (physical and mental) and three domains in activities and participation (household, mobility, and social activities) (1). There are many physical and rehabilitation medicine (PRM) interventions to address problems in functioning of those with lymphoedema. These include patient education regarding skin care, avoidance of infections, weight reduction and exercise as well as compression garments, compression bandaging, pneumatic compression, and manual lymph drainage. The combination of those known as complex decongestive therapy is the recommended treatment for breast cancer related lymphoedema (2). Regarding evidence of the effectiveness of PRM interventions in the management of lymphoedema in breast cancer survivors, a systematic review revealed moderate evidence that weight reduction was associated with a significant decrease in lymphoedema volume. Strong evidence was found for the beneficial effects of exercise in decreasing pain and tenderness caused by lymphoedema and improving HRQoL, while not decreasing or exacerbating upper extremity volume. Compression garments were also shown to be beneficial, while intermittent pneumatic compression therapy was not found superior to no treatments or others like manual lymph drainage added to compression garments (3). Complex decongestive therapy was associated with significant improvements in physical and psychological function and HRQoL, however, not based on level I evidence (4). There is also a place for low level laser therapy which has been shown to be associated with limb volume reductions (5). Traditional acupuncture might cause a decrease in the sense of heaviness and tightening in the oedematous upper extremity (6). Dance/movement therapy was suggested to have favourable effects on HRQoL, although not on body image, shoulder range of motion, or arm circumference (7). In conclusion, although there are a number of evidence-based PRM interventions to target treatment for impaired functioning in breast cancer survivors with postmastectomy lymphoedema, it seems that there is a need for more rigorous trials to show benefits particularly in activities and participation components of the ICF.

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PAIN AND PHYSICAL ANALGESIA: THE POTENTIAL OF PHYSICAL MODALITIES TO REDUCE PAIN

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Current work presents a personal opinion on some contemporaneous theories on pain and our own therapeutic concepts on physical analgesia or the potential of physical modalities to reduce the pain of adult patients.

In physical medicine, we applied the principles of gate-control theory of Melzack & Wall for central nociceptive influence. Investigations of prof Y Gacheva have demonstrated that selective electrostimulation of tactile A β -nerve fibers (with high velocity of conduction) provokes a preliminary stimulation of suppressive neurons, that inhibit tardily occurring nociceptive stimuli of A δ and C-fibers (with lower conduction velocity). It is assumed that a closer suppressive transfer mechanism exists at spinal level. At the peripheral level, direct anti-adaptation electrostimulation of the receptors probably provokes a hyperpolarization with an increase of the sensibility of nociceptors. A direct low frequency electrical stimulation of the A δ and C fibers may have an analgesic effect.

We propose our own theory to explain the mechanisms of action of physical modalities on nociceptive and neuropathic pain [we introduce the notion **physical analgesia** or anti-pain effect of physical modalities]. The physical complexes used may provoke an analgesic effect by the following mechanisms: By influencing the cause for irritation of pain receptors – a consequence of stimulation of circulation, metabolism and trophy of tissues (by low and medium frequency electric currents, magnetic field, ultrasound, He-Ne laser; massages; manual techniques); By blocking nociception (low frequency currents, including transcutaneous electrical nerve stimulation or TENS; lasertherapy); By peripheral sympaticolysis (low frequency currents like dyadinamic currents, peloids); By stopping the neural transmission (via C and A δ delta fibers) to the body of the first neuron of general sensibility (iontophoresis with Novocain in the receptive zone – the region of neuro-terminals); By input of the gate-control mechanism (TENS with frequency 90-130 Hz and interferential currents with a relatively high resulting frequency - 90-150 Hz); By activation of the reflectory connections: cutaneous – visceral, subcutaneous-connective tissue-visceral, proprio-visceral, periostal-visceral and motor-visceral (classic manual, connective tissue and periostal massage, post-isometric relaxation and stretching-techniques); By influence on the pain-translation in the level of posterior horn of the spinal medulla – using the root of activation of encephalic blocking system in the central nervous system (increasing the peripheral afferentation) and influence on the descending systems for pain control (TENS with frequency 2-5 Hz and interferential currents with low resulting frequency 1-5 Hz, acupuncture and laserpuncture; reflectory and periostal massage, zonotherapy, acupressure, su-dgok massage; preformed factors in reflectory zones /palms of hands, plants of feet, paravertebral points; zones of Head, of Mackenzie, of Leube-Dicke, of Vogler-Krauss/); By influence on the psychic state of the patient [the «doctor» drug and the «procedure» drug].

We present some personal experience concerning comparative evaluation of drug, physical and combined analgesia - on peripheral nociceptive and neuropathic pain.

Keywords: physical modalities, rehabilitation, pain, analgesia, nociceptive pain, neuropathic pain

IS BENIGN HYPERMOBILITY SYNDROME...BENIGN?

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Joint hyper mobility syndrome JHMS is a defect in connective tissue matrix proteins, caused by genes defects.

Causing some biochemical consequences leading to biomechanical consequences with easy pathology due to trauma/overuse.

Joint hyper mobility syndrome has wide range of clinical features, more than we expected. There is high possibility of association with many neurophysiologic defects. This are manifested by the presence of proprioceptive impairment, enhanced pain perception and autonomic dysfunction

Genetic link to anxiety and phobias was evident in hypermobility syndrome with high frequency of Panic disorder, agrophobia, social phobias which are 4 folds more common in hypermobile patients than control

Mitral valve prolapse is common in hypermobility syndrome with high risk of infective endocarditis.

Genital prolapse is also common in JHMS, where 75% of genital prolapse women had JHMS Vs., 14% of normal control

Symptoms and signs in infancy are mainly congenital dislocation of the hip and motor delay-late walkers. While in childhood, manifested by Juvenile episodic arthralgia, Growing pains, fibromyalgia, recurrent dislocation/subluxation, adolescent growth spurt and flat foot. This syndrome is proved not to be benign and needs much update in its rehabilitation programs as it is multisystem disease.

THERAPEUTIC MODALITIES FOR PATIENTS WITH CEREBRAL PALSY

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Cerebral palsy (CP) describes a group of disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. *The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, cognition, communication, perception, and/or behavior, and/or by seizure disorder.* According to dominant neurological signs CP could be: spastic (bilateral and unilateral), discinetic (dystonic and choreo-athetotic) and ataxic CP. In the treatment of children with CP we could use: kinesiotherapy, occupational therapy, medicamentous therapy (e.g. botulinum toxin type A), orthoses, electrotherapy (e.g. functional electrical therapy), surgical intervention etc.

Botulinum toxin type A is relatively recent addition to the available medical interventions for children with CP. Our research showed (41 patients) that spasticity of adductors of the hips and plantar flexors were significantly decreased two weeks, one and half months and three months after the treatment. Approximately 85% of patients achieved the expecting therapeutic goals according to Goal Attainment Scale. In combination with post-injection physiotherapy this treatment could provide long-term benefits. Functional Electrical Therapy is the clinical application of a small electric current to the intact nerves in order to trigger a muscle contraction. This contraction is then incorporated into a functional activity, for example walking, reaching etc. Our preliminary study (13 patients) showed improvement in performances of the paretic hand, better control and quality of movements. This method can serve as an additional treatment for habilitation of children with hemiparetic cerebral palsy. Therapeutic horse riding (THR) is one of the possible ways of habilitation in children with CP. As the horse walks, its center of gravity is displaced three-dimensionally with a movement very similar to the action of the human pelvis during gait. The warmth of the horse coupled with this rhythmical movement is *thought* to be useful in reducing abnormally high muscle tone and promoting relaxation in the rider with spastic CP. In our research (12 patients), passive range of motion (lower extremities) and muscle strength (muscles of the trunk) were significantly higher after 10 weeks of riding. Spasticity was significantly lower after the THR. During the time use of various technical and technological innovations increased e.g. robotics in (re)habilitation. The main aim is to improve the mobility of the upper and lower extremities, learning or reeducation of walking, and improving social skills of patients. Application of robotics could increase motivation of patients, and as a result is more effective (re) habilitation treatment.

The important principles in the treatment of patients with cerebral palsy is good evaluation of patients and tailored treatment for each patient.

Key words: Cerebral Palsy, children, therapy

TREATMENT OF SPASTICITY IN CEREBRAL PALSY

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Cerebral palsy (CP) is the most common physical disability in childhood. CP refers to a group of non-progressive movement and posture disorders resulting from injuries to the developing fetal or infant brain. Children have problems with motor functions as a result of limbs spasticity, which leads to severe contractures and limbs deformity. The most common characteristic of cerebral palsy is movement abnormalities: spasticity, chorea, athetosis, ataxia, dystonia, as well as their different combinations. About 70-80% of cerebral palsied children suffer from some spastic form. Spasticity is a type of muscle hypertonicity characterised by quick increase of resistance to passive stretching of muscles.

Management of spasticity in CP involves multidisciplinary intervention intended to increase functionality, sustain health, and improve quality of life for children and their carers. This may include: oral medications, intrathecal medications, physiotherapy, occupational therapy, orthoses, surgical interventions, and pharmacological agents such as botulinum toxins.

Botulinum toxin type A (BoNT-A) is a serotype of botulinum toxin, produced by the Gram-positive bacterium *Clostridium botulinum*. This potent neurotoxin selectively inhibits the release of acetylcholine from peripheral nerve terminals by binding to synaptic vesicles. Interruption of neuromuscular conduction by BoNT-A induces a temporary weakness, which reduces focal spasticity. The effects of BoNT-A last for approximately 3 months as the muscle will recover via proximal axonal sprouting, the formation of new neuromuscular junctions, and the regeneration of the original neuromuscular junctions. The efficacy of BoNT-A in the management of individuals with CP has been widely reported in the literature.

Physiotherapy for spasticity refers to a range of physical treatments. It is the most common form of treatment for spasticity in children. The treatment should be designed to meet child's specific needs and should reduce muscle tone, maintain or improve range of motion and mobility, increase strength and coordination, and improve care and comfort.

Conventional rehabilitation. Stretching forms are the basis of conventional rehabilitation for treating spasticity. Stretching helps to maintain the range of motion in joint and helps prevent contracture. To be effective, the prescribed stretching routine must be done regularly, usually once or twice a day.

Facilitation. This includes neurodevelopmental therapy (also known as Bobath approach) aimed at reducing inappropriate reflexes and training muscles to achieve normal balanced reactions. Proprioceptive neuromuscular facilitation seeks to retrain spastic muscles for normal motion. Sensory integration involves continually repeating tasks, often with the therapist directing the limb while child remains passive, so that child's brain is "retrained" in the proper movements.

Orthoses. Also known as casts, braces, or splints, orthoses include any device that is used to support, align, prevent, or correct deformities, or improve the function of movable parts of the body. When used to treat spasticity, orthoses may reduce muscle tone and increase or maintain motion.

Surgical treatments. Operations involving the nervous system (neurosurgery) and the bones, tendons, and muscles (orthopaedic surgery) are both used to treat spasticity and, in properly selected patients, can play a very important role in the treatment of chronic spasticity.

TREATMENT OF COGNITIVE IMPAIRMENT AFTER A STROKE

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The process in which people act at the highest level include cognitive or mental activities. Cognitive deficits in the neurological disease have significant impact on the patient and beyond. After the diagnosis of cognitive dysfunction such as attention, memory, visuospatial orientation, language dysfunction and executive functions, systematic techniques based on neurorehabilitation are carried out in coordinated teamwork. Solutions of motor, cognitive and neuropsychological disorder are based on three models as a single entity in the process of neurorehabilitation. These are: physical, cognitive and neuropsychological rehabilitation.

In creating the neurorehabilitation of patients with brain damage, physical, cognitive and neuropsychological rehabilitation make unique process based on individual approach, taking into account the specifics of each patient. The ultimate goal is to return activities of daily living and independence to the optimum level of functioning.

THE IMPORTANCE OF ELECTROTHERAPY IN THE OVERALL TREATMENT OF PATIENTS WITH HEMIPLEGIA

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Introduction. Stroke is a major illness in our country with huge disabling consequences. A stroke causes impairment of the cognitive, sensory, perceptive, and motor functions. Due to the unequal distribution of spasticity in the muscle groups in spastic phases Typical Upper Extremity is: Shoulder: internal rotation, Elbow: flexion, Forearm: pronation, Wrist/ Fingers: flexion, Thumb: in palm. Typical Lower Extremity Postures is: Hip & Knee Extended, Ankle Plantarflexed, Foot/ ankle inverted, OR Hip & Knee flexed, Ankle Plantarflexed. Foot drop is a common problem following a stroke. Various pain syndromes are common after stroke and require careful medical assessment and medical assessment and management. The therapy consisted of the following currents: a) Constant (constant) DC constant speed, and the • Galvanic current in the form of a stable and electroplating, Special forms of application of galvanic current Electrophoresis on drugs, b) Impulse DC. Of which are commonly used dijudinamic power, exponential power. AC can be: Low frequency (from 1 to 1000 Hz), The aim of this study was to establish distribution of electrical therapies for the treatment of patients with hemiplegia; the efficacy of a therapeutic intervention based on functional electrical stimulation therapy to improve motor function after severe hemiplegia due to stroke. Evaluate the efficacy of electrical therapy in reducing hemiplegic shoulder pain (HSP).

Materials and methods. A total of 46 subjects with acute and subacute stroke were randomized into 2 groups, ES plus conventional occupational and physiotherapy (ES group) or only conventional therapy (control group) 6 days a week for 4 weeks. Patients in spastic phases with typical Upper Extremity flexion synergism and Lower Extremity extensions synergism were randomly assigned to either a control group (n = 23; 13 female, and 10 male) or experimental group (n = 23; 14 female, and 9 male). The experimental group received additional ES therapy for shoulder muscles (supraspinatus and posterior deltoid), wrist and finger extensors, quadriceps and to the peroneal muscles and dorsiflexors of the foot in the treatment of dropped foot.

Results. A statistically and clinically significant increase in wrist extension range occurred in the subacute group that had wrist flexion contractures before the electrical stimulation. Increased extension was noted at the metacarpophalangeal and proximal interphalangeal joints, ankle joint of patients in the chronic group. We concluded that the FES program was effective in reducing the severity of shoulder subluxation and pain, and possibly facilitating recovery of arm function.

Conclusions. Different models of electric current are useful in the treatment of patients with hemiparesis for reducing pain and spastic muscle tone, improve trophics, and maintenance of the contractile ability of plegic and paretic muscles.

Key words: Stroke, hemiplegia, electro therapy, Neuromuscular electrical stimulation

BALNEOTHERAPY ASPECTS OF ZEOLITE IN MEDICAL CLINICAL PRACTICE

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Natural zeolites are crystalline aluminosilicates of vulcanic origine. Wide use of natural zeolites is enabled by their adsorptive, cation-exchange and catalytic characteristics. Clinoptilolite is a crystalline zeolite made by special nanotechnology process and used in medical purposes. Clinoptilolite is 100% natural, non-toxic and inert. It acts like an auto-bioregulator in the human and animal organism, that has a significant role in basic life processes. Mostly is used by ingestion or local skin application. It has potent antitoxic, antioxidant, immunomodulating, buffering, antiinflammatory, analgetic, hemostatic, antifungal, antibacterial and antiviral effects, that exhibits in human body. In the clinical practice, clinoptilolite effectively removes heavy metals and mycotoxins from the body, increases the antioxidant status, especially in patients with malignant disease and diabetes mellitus, sets the acid-base status of the blood to the physiological levels, reduces pain in muscles and connective tissue, stops diarrhea and external bleeding, reduces fungal infection, antagonize the effects of hepatitis B and C viruses, reduces drowsiness, speeds recovery and stimulates wound healing. Zeolite addition to the natural peloides improves their quality and makes them more effective in the treatment and rehabilitation of rheumatic diseases, posttraumatic conditions, and neurodegenerative diseases. In Serbia, the European Union, the USA and many other countries around the world, zeolit is registered as a dietary supplement and in some countries (Russia, China) as an useful remedy.

Keywords: zeolite, balneoclimatology, antioxidant, antitoxic, immunomodulators

BALNEOTHERAPY FROM EMPIRICISM TO SCIENCE

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Balneotherapy factors have been used since ancient times for therapeutic purposes, based on empirical experience carried forward from generation to generation. In recent decades, in the world, this branch of medicine is experiencing a major transformation due to scientific evidence of the effects of natural factors. New researches provide new knowledges and explore new therapeutic options, restore confidence in the old therapeutic procedures and eliminate prejudice. Balneoclimatology is becoming the branch of medicine that, in the fields of natural factors, combines not only in clinical practice but also in scientific research a large number of medical branches that normally have little common ground. In addition to dealing with the treatment and rehabilitation, in recent years balneoclimatology covers a significant place in prevention.

Natural factors used in balneology are mineral water, gas, mud and climate factors. The essence of natural factor's effects are local changes caused by the direct influence of mechanical, thermal and chemical factors through the skin and mucous membranes and complex adjustment reactions as a result of neuroreflex, humoral mechanisms, caused by stimulation of mechano, thermo, baro and chemoreceptors by biochemical active substances during the balneoprocedure. Often, the general and local effects can not be clearly distinguished, primarily because of organism's response to each natural factors's stimulus.

On the other hand, knowledge of the mechanism of action of natural factors in certain pathological conditions is of paramount importance for the application of the treatment, as well as for the clear determination of the side effects and conditions that are contraindications for their use. It is also extremely important that every natural resource is classified, based on chemical and physical characteristics, into specific categories, on which prescribing indications, and contraindications for use is based.

Studies of natural healing factors include hydrologic-experimental-clinical testings, and chemical studies divided into pharmacodynamic and pharmacotherapeutic research. The overall effect of the application of balneofactors depends on their physical properties, as well as the way of their implementation.

Total effect of these factors is product of the strength of stimulation, which along with the duration of the procedure and the surface of the body to which the stimulus acts, represents a balneotherapeutic dose (BTD). BTD determines the intensity of the stimulus that a certain balneoprocedure performs on the body. In case of inadequately determined dose, excessive as well as insufficient, instead of beneficial, effect on the body may be unfavorable.

MOST FREQUENT ERRORS AND CONTROVERSIES IN THE INTERPRETATION OF OSTEODENSITOMETRY AND INITIATION OF TREATMENT

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Currently available clinical data and sufficient assessment of bone quality, independent of bone density, does not exist, therefore, the practical guideline for the diagnosis of osteoporosis measuring bone mass is assessment by measuring bone mineral density (BMD).

Dual energy X-ray absorptiometry (DXA) - gold standard techniques, with high specificity and low sensitivity, which varies with the cutoff chosen to designate high risk.

The incidence and prevalence of osteoporosis and the risk of fracture, also differs according to the measurement site, the studied population and diagnostic techniques used. The correlation between the same measurement points and different technologies, and different measurement points and DXA evaluation is very low (<50%).

The gradient of fracture risk associated with BMD decreases with age, because age contributes to risk independently of BMD and other risk factors became more important.

Also, as various non-skeletal factors contribute to fracture risk, so the level of BMD is not just the diagnosis of osteoporosis but also an assessment of risk factor for the clinical outcome of fracture.

A distinction should be made, therefore, between BMD use for diagnosis or assessment of risk.

BMD accounts for only one of the characteristics of bone quantity, which determines the quality of bone strength. Previous data suggested that the proportion of BMD in bone stiffness and risk of fracture was 70-80%, whilst new data suggests only about 30%. Genetic factors dominate with over 60% compared to all other risk factors. At the age of 50, the number of women with osteoporosis, who will vertebral and non vertebral fractures during the next 10 years, is approximately 45%. Latest data confirmed that the overall detection rate for fractures (sensitivity) is low, and 96% of fractures at the spine, hip, forearm or proximal humerus will occur in women without osteoporosis. Low sensitivity is one of the reasons why widespread population-based screening with BMD is not widely recommended in menopausal women.

The viewpoint that measurement of bone mineral density from two or more tests, rather than at several measuring points, increases the ability to predict fracture risk, is under discussion. Seems that the same result can be achieved by defining osteoporosis, as a T- score of ≤ -2.0 SD rather than ≤ -2.5 SD.

Therefore, the diagnostic criteria for osteoporosis by DXA are not the criteria for initiation of therapy. Before making the decision to start treatment, risk factor analysis, proper DXA interpretation including technical limitations, and X-ray assessment of thoracic and lumbar vertebral segments should be performed, and secondary causes of osteoporosis excluded.

Basic BMD level is a stronger predictor for vertebral fracture risk than changes in BMD during treatment. It is not proven that an increase in BMD determines the effectiveness of treatment. In general, it is considered that the T- score reflects actual risk of fracture, and the Z- score reflects the lifetime risk. If the Z-score < -2.0 SD - then the cause of secondary osteoporosis needs to be investigated. The Z -score is important in interpreting BMD in older patients because 70% of women aged over 80 have a T-score of < -2.5 SD.

FRAX index – computer based, strikingly differs in different parts of the world.

It is used in over 45 countries where there is epidemiological data on fractures and survival as supported by primary health care. Therapeutic measures and cut off undertaken in relation to economic budget, participation and the importance of osteoporosis in any particular country.

Decision on the implementation of therapy should be based on the prior probability of the occurrence of fractures rather than on the basis of the T- score value.

Key words: Bone mineral density, initiation of treatment of osteoporosis, fracture risk

THE EFFECT OF LOAD AND EXERCISE ON BONE MASS AND STRUCTURAL GEOMETRY

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Mechanical strains, due to weight bearing or muscular loading forces, play a pivotal role in the triggering of the bone remodeling process all along the adult life. By means of remodeling, bones are able to adapt continuously to mechanical loads by adding bone tissue to improve resistance or by bone resorbing in response to a decreased use. The mechanical parameters locally influencing balance between formation and bone resorption are frequency, intensity, and duration of the mechanical stimulus. Bone strength and quality are improved if the mechanical stimulus is applied by short increments rather than over long periods. Osteocytes are able to respond to mechanical stimulation by modulating the expression and the secretion of many molecules. In particular, osteocytes are able to respond to mechanical stress via the Wnt/Lrp pathway, that is a negative regulator of sclerostin secretion, whereas the sclerostin itself is a negative regulator of the bone formation. Osteocytes can propagate their message to other connected cells by diffusion of produced molecules (paracrine effects), and by local transmission through gap junctions. Physical activity has a positive impact on bone quality. On the other hand, the reduction of mechanical loading, such as in a murine model mimicking weightlessness, increase osteocyte apoptosis, osteoclast recruitment and bone resorption. The global role of the osteocyte in mechano-sensing is generally accepted but the molecular pathways involved in the mechano - sensing phenomenon remains debate.

REHABILITATIVE INTERVENTIONS FOR PREVENTION OF FALLS IN PATIENTS WITH OSTEOPOROSIS

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Introduction: Osteoporosis is the most common metabolic bone disease and can result in devastating physical, psychosocial, and economic consequences. Fragility fractures, which occur secondary to low-energy trauma are characteristic of osteoporosis. Many individuals experience morbidity associated with the pain, disability, and diminished quality of life caused by osteoporosis-related fractures.

Aim: The aim of the article is to present the current knowledge from clinical trials about using the rehabilitative interventions for prevention of falls in patients with osteoporosis.

The first step in the management of osteoporosis is the assessment of the patient's risk of osteoporosis related fractures, which may be well managed by BMD measurement with DXA, using WHO Fracture Risk Assessment Tool (FRAX®), assessment of balance etc. There are many medical and environmental risk factors for falling. Medical risk factors includes weak muscles, impaired mobility and transfer, poor balance, reduced proprioception, diminished cognitive skills, neurologic factors, kyphosis, vestibular dysfunction, vertigo, eyesight disturbances, orthostatic hypotension, urgent urinary incontinence, receiving some medications etc . Extrinsic and environmental risk factors are slippery outdoor conditions, obstacles in the walking path, low level lighting, lack of assist devices in bathrooms, inappropriate shoes, inappropriate orthopedic devices etc.

There are many PRM interventions for modifying these risk factors like weight –bearing and muscle strengthening exercises, balance training, proprioception exercises, posture training, activity of daily living and mobility training, Tai Chi exercises, appropriate orthopedic devices (corsets, braces, orthopedic shoes, walking aids), assist devices in bathrooms and halls, urogynecological rehabilitation etc. Patient education is paramount in the treatment of osteoporosis.

Conclusion: Regarding evidence rehabilitative interventions have a significant role in modifying risk factors for falls in patients with osteoporosis. That is very important in prevention of fall-related fractures incidence and their impact on quality of life in this population.

Key words: osteoporosis, rehabilitation, prevention, falling

COMPLEX REGIONAL PAIN SYNDROME TYPE 1 - THE IMPORTANCE OF EARLY DIAGNOSIS AND APPROPRIATE TREATMENT

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Complex regional pain syndrome (CRPS) is a chronic condition with clinical features that include pain, sensory, sudomotor and vasomotor disturbances, trophic changes, and impaired motor function. The difference between CRPS I and II is based on the presence or absence of nerve damage: CRPS I (also known as reflex sympathetic dystrophy) is not associated with nerve damage, whereas CRPS II is associated with objective evidence of nerve damage. However, there are growing evidence of minor nerve lesions in CRPS I, also.

A chronic CRPS causes multiple problems for both patients and practitioners, due to the large variety of available treatment options, but currently has no cure. Also, there is a small number of high-quality research on this subject and no strong consensus regarding the optimal management of CRPS. For a wide range of commonly used interventions, there is either no evidence or very low quality evidence available from which no conclusions should be drawn.

Early diagnosis and appropriate treatment (or avoidance of mistreatment) is certainly crucial to avoid chronicity and to limit the disability from the disease. Early treatment, ideally within three months of the first symptoms, often results in remission. If treatment is delayed, however, the disorder can quickly spread to the entire limb and changes in bone, nerve and muscle may become irreversible. For early diagnosis, monitoring of acute injury from the very beginning to the estimated duration of the treatment is crucial. It is important to alert clinicians not to overlook CRPS, especially if they suspect that patient may not follow the expected course of recovery within the expected length of time.

Treatment plan: Following a CRPS diagnosis, treatment should be focused primarily on pain control and functional restoration. Physical and occupational therapy are the cornerstone and first-line treatment for CRPS. It is important to start early with gentle exercises, desensitization techniques and education of patients to take active role in their rehabilitation and to encourage them to use the limb.

In the early onset, under the assumption that neurogenic inflammation is the pathological mechanism, NSAIDs and steroids should be administered. NSAIDs are used first and their dose should be increased until the pain is well controlled. NSAID may counteract the ongoing inflammation; early use may be an important step in preventing sensitization. Glucocorticoids targeting mast cell activity, correct the baseline inflammatory status to lower disease activity and, thus, lower production of pro-inflammatory cytokines and also prevent central sensitization. If the pain is not reduced then other types of medicine are used: tricyclic antidepressants, gabapentin or bisphosphonates. Physical therapy modalities that are empirically proved to reduce pain and edema or modulate inflammatory process should be used as soon as CRPS is diagnosed. Psychological or psychiatric therapy (cognitive behavioral therapy and relaxation techniques) and initial sympathetic block trial may be considered in cases that do not demonstrate functional gains during initial treatment. Some patients will develop long-standing CRPS. Then, the treatment must change its target, from functional restoration to relieving the symptoms and helping people with this syndrome to live as normal life as possible. They required multidisciplinary approach.

In conclusion: CRPS is quite often misdiagnosed, diagnosed too late, or it is believed that it is "all in their head". As a result, many patients do not receive the proper treatment on time and they suffer needlessly. Given the importance of early diagnosis and treatment of CRPS, it is important to raise awareness and knowledge of medical staff about CRPS.

FIBROMYALGIA: BEST EVIDENCES IN PHYSICAL AND REHABILITATION MEDICINE

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Introduction: Fibromyalgia (FM) is a syndrome of persistent widespread pain, stiffness, fatigue, disrupted and unrefreshing sleep, and cognitive difficulties, often accompanied by multiple other unexplained symptoms, anxiety and/or depression, and functional impairment of activities of daily living (ADLs), is a now recognized as one of many central pain-syndrome that are common in the general population. It typically presents in young or middle-aged women with a prevalence varying between 0.66 and 10.5% in studies. A new ACR Criteria Proposed for diagnosing Fibromyalgia. Tender points have been replaced. The diagnosis is based on evaluating WPI (Widespread Pain Index) score and SS (Simpton Severity) score. Some investigators believe that a successful FM rehabilitation program involves a multidisciplinary team of professionals and various modalities individualized for each

Aims: The objective of this study is to demonstrate best effectiveness of the rehabilitation program in FM.

Method: we have used different sources of search: Scientific Pub Med-MEDLINE, Pedro, Cochrane Library, the Ottawa Panel, EULAR and magazines.

Results: A combination of pregabalin or serotonin noradrenaline reuptake inhibitors as pharmacological interventions and multicomponent therapy, aerobic exercise and cognitive behavioural therapy as non pharmacological interventions seems most promising for the management of FM, which is tailored to each individual patient. Physical fitness benefits from the treatment can be maintained over the long term. Therefore, there is an important role for PRM specialists to prescribe exercise for their patients with FMS at a suitable intensity tailored to the condition of the individual patient that will not exacerbate FMS symptoms

Key Words: rehabilitation, scientific evidence, fibromyalgia

CURRENT CONCEPTS FOR IMPROVING REHABILITATION OUTCOME IN ATHLETES AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Introduction: Anterior cruciate ligament (ACL) injury is one of the most serious injuries related to sports performance. This type of knee injury is especially common in athletes participating in so called pivoting sports that are characterised to put high demands on knee joint stability. Unrestricted participation in sports and return to the pre-injury level is often considered an indicator of the success of ACL reconstruction. Following a bone-patellar tendon-bone autograft (BPTB) or four-stranded semitendinosus/gracilis tendons autograft (ST/G) anterior cruciate ligament (ACL) reconstruction, the speed and safety with which an athlete returns to sports (or regains the pre-injury level of function) depends on the rehabilitation protocol. Considering the large differences in clinical and outpatient protocols, there is no consensus regarding the content of such a rehabilitation program. Another problem that exists is a lack of information and consensus regarding the appropriate criteria for releasing patients to unrestricted sports activities postoperatively.

Materials and methods: A literature search was conducted using the Medline database. A systematic search was performed to identify the factors investigators used to determine when return to athletics was allowed after primary ACL reconstruction. Inclusion criteria were English language, publication within the last 10 years, clinical trial, all adult patients, primary ACL reconstruction, original research investigation, and minimum 12 months' follow-up.

Results: Rehabilitation after anterior cruciate ligament (ACL) reconstruction should consider control of postoperative pain and swelling, protection of the healing graft, restoration of full range of motion symmetric to the contralateral knee, strengthening of the muscles that stabilize the knee, hip, and trunk, enhancing neuromuscular control, and a gradual progression to functional activities that are required for return to sports. The effects of concomitant injuries and surgical procedures must also be considered in planning an individualized rehabilitation program. A significant proportion of our reconstructed patients do not return to their previous sporting levels. The ability of the patients to return to sports after ACL reconstruction is governed by various factors which include the postoperative knee function, social reasons, psychological hindrances such as fear of re-injury and even monetary considerations in professional athletes. Fear of re-injury is an important psychological factor for these patients not returning to sports.

Conclusions: The presented results clearly indicate that an accelerated protocol without postoperative bracing, in which reduction of pain, swelling and inflammation, regaining range of motion (ROM), strength and neuromuscular control are the most important aims, has important advantages and does not lead to stability problems. Preclinical sessions, clear starting times and control of the rehabilitation aims with objective and subjective tests facilitate an uncomplicated rehabilitation course. Few objective functional criteria are used to determine when patients return to unrestricted sports activities. Clinically feasible recommendations are made for measurement of muscle strength, lower limb symmetry, lower limb neuromuscular control, and ligament function in patients who desire to return to athletics after ACL reconstruction. There is a significant psychological component to return to previous sporting levels in patients after ACL reconstruction.

Key words: ACL reconstruction, rehabilitation

THE CHALLENGES OF LOW BACK PAIN

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Low back pain (LBP) is one of the most common and potentially disabling pain conditions. Despite the frequent occurrence yet to date it has been relatively under-funded regards to diagnosis, patophysiology oriented treatments and effectiveness of wide range of therapeutical interventions. Management of low back pain has been described as arbitrary, inappropriate, or ineffective.

LBP are classified according to pathoanatomic and/or clinical features, including movement based classification, whereas fewer studies utilized a psychosocial and even less, a biopsychosocial approach, but there is still no system which is internationally established, effective, reliable and valid.

Pain as a prominent phenomenon of LBP may impact all three domains of functionality: cognitive, psychosocial and physical ability. The details on pain induced changes in each of these domains are still not well understood. Pain intensity is associated with poor physical functioning but impact of indirect effects of pain through the concomitant cognitive and psychosocial changes are unknown. Further researches are necessary to explain how pain impact on cognitive and psychosocial functioning could additionally worsen the physical abilities.

Patophysiology of pain could be different during the course of disease and between patients. About 10% of patients develop neuropathic component. One of the main challenge is to identify factors associated with a chronic course regards the fact that at 12 months follow-up, the percentage of the patients still had back complaints ranged from 26-45%.

Evidence from randomized controlled trials demonstrates that there is low quality evidence for the effectiveness of exercise therapy compared to usual care, there is low evidence for the effectiveness of behavioral therapy compared to no treatment and there is moderate evidence for the effectiveness of a multidisciplinary treatment compared to no treatment and other active treatments at reducing pain at short-term in the treatment of chronic low back pain. Few available evidence for acute and subacute LBP is not enough to draw rational therapeutical rehabilitation approach. The heterogeneity of the populations, interventions, and comparison groups are the main characteristics of available studies. Additionally it seems that many conclusions of studies of exercise and physical therapy for low back pain have been based on statistical significance of results rather than on clinical importance.

PUBLISHED REVIEW DATA OF LOW LEVEL LASER THERAPY IN NECK PAIN SYNDROME

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Approximately 10% to 15% of the world's populations suffer from an episode of neck pain at any time. Neck pain is a one of the most frequent condition negatively impacts on overall health status and the causes of dysfunctions due to an increase in intensity of pain and decreasing of level quality of life. 40% of the population will suffer from neck pain over a 12-month period. Causes of pain vary from myofascial strain/sprain to myelopathy. Several guidelines on the management of neck pain have been published. However, there remains no definitive consensus on this topic. Although acute neck pain generally resolves with conservative treatment.

Low level laser therapy (LLLT) was used to treat a variety of musculoskeletal conditions including neck pain syndrome, despite a lack of strong scientific evidence and consensus supporting its efficacy. The exact mechanisms of action are still unknown, although some proposed physiological effects include anti-inflammatory action and reduction of oedema and pain. One of the main problems in evaluation of LLLT effects is the extremely wide variations seen in terms of crucial laser beam parameters, methods of application and site- specific doses. Despite the fact that the WALT as early as 2006 recommended that the energy dose in clinical investigation should be expressed in J instead of J/cm², these two parameters are still often switched in a number of current published studies. This confusion affects the validity and reproducibility of such studies. Even when the both parameters are shown in studies, the calculations often are incorrect, and therefore, results regarding LLLT in neck pain syndrome are misleading.

Due to high clinical heterogeneity, different pathophysiological substrate and actual clinical stages examined in different investigations involved in cervical syndrome (non-specific neck pain, myofascial pain syndrome, cervical osteoarthritis, CDS and radiculopathy), the published data was inappropriate (Brzezinska B.1993, Vahtin V I. 1994, Kulinski W 1994, Bjordal JM 2003, 2006,2012, Lopes Martins RIB 2007).

In the studies they observed that net energy doses between 6J and 10J had significant anti-inflammatory effects using a continuous wave 830-nm laser, while net doses of 12J and above gave lesser or insignificant results. LLLT delivered at low doses tends to work better than the same wavelength delivered at high levels, which illustrates the basic concept of biphasic dose response or hormesis (Calabrese 2005).

Moreover, several dose-finding laboratory studies have "recently shown us that more is not necessarily better, and that the positive effects may in fact be lost in overdosing LLLT.

Because of the above mentioned reasons criticism persists as to how conclusions were reached with regard to the efficacy of LLLT in neck pain syndrome in published papers, as well as in systematic meta-analysis.

Key words: neck pain syndrome, low level laser therapy, site specific doses, laser beam parameters

O – 001

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**EXERCISE TESTING AND AEROBIC TRAINING IN PATIENTS IN SUB-ACUTE STAGE
AFTER STROKE**

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Introduction: The aim of the study was to determine if individually prescribed aerobic training, based on stress testing, improves cardiovascular performance of patients in the subacute period after stroke.

Materials and methods: The aerobic capacity of stroke patients (with first stroke and adequate physical and cognitive ability to take part in testing) was measured by stress testing using adapted bicycle (Corival Recumbent - Lode) at admission and discharge from the inpatient subacute stroke rehabilitation. The RAMP protocol was used increasing the work load by 2 or 3 W every 11 seconds. Blood pressure was measured with a non-invasive automatic measuring device, heart rate and ECG curve were monitored. The aerobic training on the exercise bike was prescribed individually according to the stress testing results. The training was performed once or twice a day at 80% of heart rate reserve intensity, for 5 to 6 weeks, the duration of training time progressively increased every week. In addition standard stroke rehabilitation programs were carried out 5 days per week at least 3 hours per day.

Results: Fifteen stroke patients meeting the inclusion criteria were included in the pilot study, mean age 49.7 years (SD 14.2), ten suffered hemorrhagic stroke, five ischemic stroke, 13 patients with right sided hemiparesis, mean time from the onset of stroke 124 days (median 112 days). The mean achieved load at the stress testing at admission was 81 W (SD 37), mean VO₂ max 18,3 ml/kg/min (SD 3,3) and at the stress testing at discharge 93,7 W (SD 37) and 20,7ml/kg/min(SD 4,4), respectively. On average the increase of the patients' aerobic capacity was 18.2% (7% to 39 %).

Conclusion: On the basis of the stress testing prescribed aerobic training improves cardiovascular performance of patients in the subacute period after stroke. To assess the role of standard stroke rehabilitation programs for improving the aerobic capacity, the control group will be include in future.

Key words: stroke, exercise testing, aerobic training

**CORRELATION BETWEEN THE SCORES OF FUNCTIONAL INDEPENDENCE MEASURE
AND BERG BALANCE SCALE AFTER INPATIENT REHABILITATION IN STROKE
SURVIVORS**

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Introduction: The sequelae of stroke are frequent motive for admission in rehabilitation centers. In our service, patients are evaluated at admission and discharge with the Functional Independence Measure (FIM), a multidimensional scaling with 2 main areas: motor (13 items) and cognitive (5 items), and with the Berg Balance Scale (BBS), to evaluate the evolution of the performance globally and in the specific area of balance. The BBS assesses the functional performance in 14 items related to tasks often used in everyday life. Each is rated from 0 to 4 points. The goal of this study was to evaluate the outcome of the inpatient rehabilitation program, regarding balance (measured by BBS), and if they correlated positively with the functional gains, measured by FIM.

Materials and Methods: Prospective, non - interventional study. Cohort of 159 patients treated between 11/08/09 and 21/02/12. Patients included were aged 24 to 88 years, all stroke survivors, undergoing an inpatient rehabilitation program, including improvement of motor performance as one of the main goals. The scales used were FIM and BBS. The results were statistically analyzed with Paired Samples T-test, Pearson Correlation Test (confidence intervals were defined at 0.001).

Results: From a total of 159 evaluated, we obtained a sample of 131 patients who had FIM and BBS records at admission and discharge from hospital. Of the latter, 39.7% were female and 60.3% male, with an average age of 60 years. The majority (75%) had ischemic stroke. They had left hemiparesis in 47.3%, right hemiparesis in 50.4% and tetraparesis in 2.3% of cases. Regarding FIM, the variations in total score and motor sub-score were in average 64 to 89 and 43 to 64 respectively. The difference between initial and final scores was significant ($p < 0.001$). The average BBS was 19 at admission and 33 at discharge, and the difference was significant ($p < 0.001$). The correlation between the variation FIM total scores, FIM motor sub-scores and BBS scores during the inpatient treatment was positive and significant ($p < 0.001$).

Conclusions: These data suggest that our inpatient rehabilitation program for stroke survivors was beneficial, with significant improvement of functionality measured by FIM, including motor functions measured by FIM motor sub - scale. Furthermore, these outcomes correlated positively with the gains found in balance control, measured by BBS.

Keywords: Stroke, neuro - rehabilitation, balance, functioning

O – 003

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NEUROREHABILITATION (COST-BENEFIT ANALYSIS)

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Introduction and aims of the study: Although the main problem in fact is pathophysiological, the great amount of brain plasticity and capability for functional reorganisation, allow us to modify abnormal musculoskeletal motor, such as, the other brain functional schemas and to stabilise motor control at the level that exerts volitional movements.

Purpose: According experience in our institution we prefer, in situations of reaching plateau in the brain lesions recovery, implementation of additional therapeutic procedures such as: cooling muscles, PNF kinesiotherapy and electroneurolysis.

Methods: In evoking therapeutic benefits we tried with various curative methods, predominantly PNF kinesiotherapy and electrotherapy (TENS+FES), to stimulate patients motor control to be exerted on higher level, which expresses on their functional capabilities, on few phases: 1. Hand skills, 2. Locomotion, 3. Selfcare, 4. Socialisation, 5. Individuality. All phases can be monitored by some measuring instrument, such as: Ashworth scale, Fugl-Meyer scale and FIM Index.

Results: We managed to reintegrate patients in environment, e.g. to help them to become effective, efficient in social stuffs and economically independent.

Conclusions: It's evidently, that management of ICV and TBI patients, in estimated series, needs improvement, somewhat due to acceleration of adopting them to rehabilitation centers, somewhat, in attempt of optimising rehabilitation goals.

According demands for individual benefits, one may resume, that summe of material or direct, also as indirect savings, in neurorehabilitation, estimated by this analytic method was evident.

According this results, reconvalescents, more then ever, obtained selfindependency. Meanwhile, many of them reach an working ability, which means, not only, that they continue to earning enough money for them, but at amount that allow to invest in health policy and social society funds, equal as the other workers.

AUTONOMY IN AMBULATION IN STROKE SURVIVORS – OUTCOMES OF AN INPATIENT REHABILITATION PROGRAM, MEASURED BY FIM AND FAC

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Introduction: Stroke is one of the main causes of incapacity in developed countries. A number of factors may influence the functional prognosis of patients. The possibility of being included in a comprehensive inpatient rehabilitation program is of major relevance to the achievement of the best possible functional status, autonomy and quality of life. The Functional Independence Measure (FIM) is a widely used outcome measurement. It has 18 items and is scored 18 to 126. Motor FIM sub-scores range from 13 to 91, and cognitive FIM sub-scores range from 5 to 35. The Functional Ambulatory Categories (FAC) measures the ability to ambulate autonomously, and it is scored 0 to 5. The purposes of this paper were: to evaluate the functional achievement of stroke survivors during inpatient rehabilitation, measures by FIM; to investigate the correlation between the changes in FAC scores and FIM motor sub-scores occurred during the inpatient rehabilitation phase.

Subjects and Methods: This was a retrospective study based on data collected from the medical files of 159 stroke survivors treated as inpatients in an adult rehabilitation Service, between 11/08/09 and 21/02/12. Ages varied from 24 to 88 years. Functional status was evaluated and measured at admission and discharge using FIM. The ability to ambulate was measured at admission and discharge by FAC. The score changes and the possible correlation between the gains measured by these 2 instruments were investigated. The results were statistically analyzed with Paired Samples T-test, Pearson Correlation Test (confidence intervals were defined at 0.001). **Results:** From a total of 159 patients we obtained a sample of 133, which were evaluated with both FIM and FAC at admission and discharge. They were aged 59 in average. There were 59,3% of males and 40,6% of females. Ischaemic stroke accounted for 74%, of which 47% had left hemiparesis, 49.6% had right hemiparesis and 3% had all 4 members affected. FIM total scores changed from 64 to 89 in average. FIM motor sub-scores changed from 43 to 64 in average. The difference between admission scores and discharge scores was statistically significant for both scales ($p < 0.001$). Regarding FAC, 38% of subjects were unable to walk at admission. FAC average score at admission was 1, and it was 3 at discharge. This difference was statistically significant ($p < 0.001$). The correlation between FIM total scores, FIM motor subscores and FAC scores was clearly positive and significant ($p < 0.001$).

Conclusions: There were 133 of the 159 patients, who met the study criteria. These patients had clear functional gains, revealed by the three outcome measures, and the change was statistically significant. There was a strong positive correlation between the results achieved and reported.

Key-words: Stroke, ambulation, function, outcomes, rehabilitation

**OBSTETRICAL BRACHIAL PLEXUS INJURY REHABILITATION PROTOCOL - OUTCOME
MEASURE OF EARLY INTERVENTION**

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Introduction: The obstetrical brachial plexus injury (OBPI) is caused by an injury resulting from distension of the brachial plexus nerve structures in newborn (NB) which is usually produced after, before or during parturition. The most relevant risk factors for OBPI are macrosomic infants with cephalic presentation and shoulder dystocia and preterm NB with pelvic presentation and fetal suffering and/or hypoxia. In our PMR Department we perform that all NB with OBPI caused in parturition should have a clinical evaluation by a Physiatrist during the first 48 hours of life and subsequent seriated evaluations during the first months. Those evaluations include observation of affected upper limb attitude, joint active and passive range of motion (ROM), active movement of other limbs, primitive and osteotendinous reflexes, postural reactions, sensibility and shoulder function. We defend that all NB with OBPI should have a continuous rehabilitation treatment during the first 6 months after injury and then the treatment frequency should be revised and adjusted to each case. Rehabilitation program main objectives to OBPI are the maintenance of the complete joint range of motion and to enhance the muscles without injury associated. Other goals are to stimulate the contraction of paretic muscles, avoid limitation of range of motion and maintain correct cortical patterns of movement. Scientific literature on OBPI issue as the consensus that early intervention is the key point in rehabilitation program. In summary, our Hospital Protocol Performance in OBPI is based on theoretical model that faces this clinical entity as an acute peripheral neuropathy secondary to a traumatic event in which early therapeutic approach is critical and should consider three basic principles: rest, increasing of motor and sensibility pattern of the affected limb and prevention of muscles imbalances.

Materials and methods: Retrospective study of the evolution of the newborns referred for first consultation of Pediatric Rehabilitation by a paediatrician. Inclusion criteria: NB with OBPI with first assessment in 2012 and that ended the Rehabilitation Protocol till June 2013. To assess the clinical evolution we collected data from informatic clinical file that included the Moro reflex and grip; active elbow flexion (based on Active Movement Scale) and shoulder abduction (based on Gilbert scale). **Data collection:** Consultation of hospital computer records relating to consultations cited. To provide the statistical analysis we determine the age at beginning of the programme, the average time integration protocol and evaluated the changing on clinical scores of motor function between the entrance and discharge of the protocol.

Results: We defined a sample of 28 newborns. The average duration of the protocol was 18 weeks. 85% of the sample had first consultation until the end of second week after birth. Improvement of elbow and shoulder active movement was observed in all newborns. Almost 10% of our sample needed botulinum toxin injection to improve the motion pattern.

Conclusions: The referral made to the consultation was suitable in most cases as the majority of the authors argue that infants with suspected OBPI should be referred in the first 15 days after birth. The authors also defend the early referral for allowing teaching parents the correct placements and postures to help reduce the potential functional restriction in the future.

Key words: obstetric palsy; brachial plexus palsy; rehabilitation

MORPHOPHYSIOLOGICAL EVALUATION AS DIAGNOSTIC TOOL IN CHILDREN WITH SPINAL DYSRAPHISM

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Introduction: Spinal dysraphism (SD) present congenital anomaly with multifactorial inheritance. Possible genetic role was evaluated in numerous studies both on molecular and population genetic level. The purpose of this study is to evaluate morphophysiological expressions between healthy individuals and patients with SD.

Material and methods: We have evaluated 90 patients with SD (50 patients with spina bifida occulta – SBO and 40 patients with spina bifida aperta – SBA) from Serbian population. The control group of 100 individuals without SD were randomly selected from Serbian population with similar socioeconomic status and age. Presence of several morphological traits were analyzed in patients with spina bifida occulta (eg. hypertrichosis, gluteal line assymetry, fovea spinalis, hypo/hyper-pigmentation). Also, presence of 9 homozygous recessive traits (HRT) from head region in each individual were analyzed.

Results: Presence of morphophysiological traits was significantly more frequent in patients with SBO compared with control ($p < 0.05$). There is decrease in number of phenotype classes for patients with SD versus healthy individuals (SD-48/Control-58). In group of SD patients the most frequent number of phenotype classes are combinations with 3 and 4 HRTs, while for healthy individuals between 2 and 3 HRTs. Between SBO and SBA groups of patients there are no significant changes in number of phenotype classes for tested HRT (SBO-32 phenotype classes/SBA-34 phenotype classes).

Conclusions: Our results pointed out that there is increased homozygosity and decreased variability for tested genes responsible for evaluated characteristics in patients with SD compared with control. These findings may point out that some phenotype classes (phenotypes) are more liable for the expression of SD.

Key words: spinal dysraphism, morphology, phenotype classes, children

BAROPODOMETRIC EVALUATION OF CHILDREN AFFECTED BY OBSTRUCTIVE SLEEP APNEA SYNDROME: A PILOT STUDY

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Introduction: Obstructive Sleep Apnea Syndrome (OSAS) is characterized by recurrent episodes of obstruction of upper airways, with absence or reduction of at least 50% of breathing, mainly caused by pharynx collapsing. In pediatric patients with OSAS, abnormal postures are frequent not only during sleep. Recent studies suggest that there might be an association between tongue mobility alteration during deglutition and the development of both occlusal and postural breathing dysfunctions. Therefore rehabilitation is based on strengthening exercises of the tongue, oral and facial muscles. During sleep, the tongue should be hold up with dorsal and terminal portions in contact with the *rugae palatinae* located on the anterior side of the palate behind the *papilla incisiva*.

The aim of this pilot study is the evaluation of the variations in the podalic support and in the oscillatory surfaces in children affected by OSAS.

Materials and methods: We evaluated seven children affected by OSAS (3 males, 4 females; mean age 9.32 years; SD 2.60) diagnosed with cardio-respiratory polysomnography at the Child and Adolescent Neuropsychiatry Service of the Second University of Naples. Moreover, all subjects performed baropodometric examination in static position and the stabilometric evaluation with opened (OE) and closed eyes (CE). In particular, in the static examination we focused on the total surface of feet and on the lower limbs load distribution with OE-opened teeth (OT) in normal occlusion, with OE-closed teeth (CT), with OE and the tongue in contact with *rugae palatinae*, behind the *papilla incisiva* (RP), with OE- dental cotton rolls (R). The stabilometric examination evaluated the ellipse surfaces and the mean speed of oscillation with OE-CE, lingual spot, closed teeth and rolls.

Results: In static, the mean of load surfaces is 162.75 cm² OE-CT; 167.32 cm² OE-CT; 179.82 cm² OE-RP; 160.04 cm² OE-R. The average of load distribution between the two lower limbs underlines a left overload in all the exams: 57.34% OE-OT; 57.51% OE-CT; 56.04% RP; 58.57% R. The stabilometric examination showed mean of ellipse surfaces is 73.81 mm² OE-OT; 49.19 mm² OE-CT; 53.89 mm² OE-RP; 63.89 mm² OE-R; 37.10 mm² CE-OT; 51.04 mm² CE-CT; 32.91 mm² CE-RP; 61.54 mm² CE-R. Moreover, the mean speed: oscillation was 5.90 mm/sec OE-OT; 5.43 mm/sec OE-CT; 5.38 mm/sec OE-RP; 5.85 mm/sec OE-R; 5.56 CE-OT; 5.13 mm/sec CE-CT; 4.57 mm/sec CE-RP and 5.69 CE-R.

Conclusions: These preliminary findings may suggest that children with OSAS present a surface load with OE-OT lower than with OE-CT and OE-RP and higher than with OE-R. Moreover, the mean reduction of the ellipse surface and in the mean speed with OE-RP respect of OE-OT could suggest the role of lingual-palatine stimulation for the postural balance and for the oscillation regulation system.

Keywords: Baropodometric examination, stabilometric examination, children, OSAS

THE EFFECT OF SCHROTH'S EXERCISES ON CORRECTION OF BAD POSTURE BY SCHOOL CHILDREN

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Introduction: Bad posture by school children can be increased by many external factors like school bags, not ergonomic furniture, clothes and long bad posture in front of video terminals. It is good to be early recognized and treated to prevent functional disorders.

The aim of our study was to assess the effect of Schroth's spine exercises on correction of bad posture and function of lungs.

Material and method: the 80 school children age 10 years, were evaluated before and after treatment with three checking methods: 1. four clinical examination test (upper arm, Adams's test, Test by Mathias and test for shorter legs muscles), 2. Skin surface method with Spine mouse device and spirometry.

Results: the effect of exercises was significant with all three checking methods. The children were treated in period of two months, three times per week, 40 min. class.

Discussion: More and more children have long bad posture and it is increased with decrease of physical activity and sitting a long time in front of video terminals. The 10% of those children can be with risk to become structural deformity. Elimination of outside factors and inclusion of exercises can be a prevention activity in and outside of school programs. Conclusion: Schroth's exercises give a significant $p < 0.05$, goodness of correction of curve by clinical test and reduction of hyper kyphosis. They have positive effect on functional lungs status with increase of vital capacity.

Key words: bad posture, Schroth's exercises, correction

O – 009

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THE ROLE OF PRM AT PRIMARY HEALTH CARE CENTERS

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Rehabilitation medicine can be defined as the medicine of human functioning.

According to the World Health Organization (WHO1994) Community Based Rehabilitation (CBR) is a strategy within community development for the rehabilitation, equalization of opportunities, and social integration of all people with disabilities.

Primary Health Care (PHC) needs to address the main health problems in the community, providing promotive, preventive, curative and rehabilitative services. PHC personnel can facilitate links between people with disabilities and special services.

Studies and analysis of the World Bank demonstrate widely spread, both absolute and relative poverty in the countries of our region.

In Belgrade, Podgorica, Zagreb, and the others in this region, there are departments of PRM, as a part of PHC centers, where work, depends on number of habitants, some specialists of PRM, with therapists. They take care about treatment and rehabilitation after trauma, in musculo-skeletal, neuromuscular disorders, after trauma, prevention in childhood according to postural disorders, scoliosis, and others. Our aim is to improve PRM in PHC centers, to develop as CBR.

As Community Based Rehabilitation aims at activities of the community to improve quality of life of people with disabilities, PRM can contribute to the strategy of CBR. PRM in outpatient settings can contribute on three levels: giving advice to communities teaching primary care physicians and other medical specialists case management for people with disabilities.

Key words: prm, cbr, phc

O – 010

Abstract No.: 13738272785947

**EVALUATION OF REHABILITATION PROGRESS USING THE FUNCTIONAL
ASSESSMENT MEASURE (FIM+FAM)**

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Introduction: The objective of this work is to quantify functional gains of a group of patients subjected to a rehabilitation program in a Portuguese General Hospital using the Functional Assessment Measure (FIM+FAM).

Materials and methods: Observational study using admission and discharge data from patients admitted to the Rehabilitation Department of Faro Hospital in the time period between January 1st and December 31st 2012. Patients were divided according to the following diagnostics: Stroke, Traumatic Brain Injury (TBI), Spinal Cord Injury (SCI) and Complex Orthopaedics Injuries (COI). The FIM+FAM scores were statistically analysed using the Statistical Package for the Social Sciences version 18 of Windows (SPSS).

Results: 20 patients met the inclusion criteria. 14 (70%) were male and 6 (30%) were female. The average age at admission was 53 years, ranging from 17 to 85 years. The average length of stay was 47 days (minimum 7 and maximum 162 days). The most frequent diagnostic group were the Stroke – 9(45%); SCI – 5(25%); TBI – 3(15%); and COI – 3(15%).

Average FIM+FAM at admission was 90,6/210 (minimum 28, maximum 169), and at discharge 142,6/210 (minimum 74, maximum 207). The average gain of FIM+FAM was 52/210 this was found to be statistically significant by the Wilcoxon test ($p=0,001$).

Conclusions: This study characterized the inpatients at a rehabilitation department in Acute General Hospital during the year 2012. The Portuguese version of FIM+FAM was found to be useful and practical tool in assessing functional gains of this group of patients.

Key words: FIM+FAM, functional recovery, rehabilitation

O – 011

**THE USING OF THE BALNEO CLIMATE FACTORS AND THERAPY IN JORDAN IN FIELD
OF PHYSICAL AND REHABILITATION MEDICINE**

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A complete study for climate factors and natural agents available in Jordan which may be used, in Balneo Climatic Therapy.

- Concerning: the climate in Jordan classified in general as Mediterranean climate (Macro climate) and particular as local climate (Micro climate). Four types of climate have been mentioned (under sea level, sea level, mountain, desert climate).

- Concerning natural agents they are classified as two types (Natural mineral water and Mud). As for mineral water it has been classified from the physical point of view as the following: hypothermic, thermic, hyperthermic water and from the chemical point of view as: sulfuric water, carbonic water, radon water. The mud has been classified into two types (organic mud and inorganic mud).

Special characteristics of the Dead Sea Region has been proved in their positive results for psoriasis, certain rheumatic disease, certain locomotors & respiratory system.

SIMULTANEOUS BILATERAL QUADRICEPS TENDONS RUPTURE IN A PATIENT WITH POLYNEUROPATHY – A CASE REPORT

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Introduction: Simultaneous bilateral quadriceps tendon rupture is a rare injury, and generally occurs in men over the age of 50 who are diabetics, obese, or have age related changes in their tendons (1). Other factors leading to tendon rupture mostly in younger individuals include local steroid injections, use of anabolic steroids, history of chronic tendonitis, chronic renal failure, hyperparathyroidism, rheumatoid arthritis, systemic lupus, and gout (2). A similar case of bilateral quadriceps tendons rupture after statin use has been described (1). These predisposing conditions cause tendon degeneration by altering collagen synthesis, causing sclerosis or fibrosis in the tendon, fatty degeneration, decreased tendon collagen composition, necrosis, or calcification (2).

Case report: A 66-year-old man with a history of sensory - motor polyneuropathy of unknown etiology, presented to the emergency department with bilateral suprapatellar knee pain and swelling after a fall. He was unable to walk or actively extend his knees after the incident. Radiographs of the knees showed abnormal soft tissue contour in the suprapatellar region and abnormal calcific opacities several centimeters cephalad to the patella in both knees. Bedside ultrasound using a high-frequency linear probe was performed (1). The high-resolution images showed irregular thickening and retraction of the quadriceps tendons which were attached to hyperechoic foci well above the patella; in addition anechoic fluid collections were identified. These findings confirmed the clinical and radiographic diagnosis of bilateral quadriceps tendon rupture with avulsion of the superior pole of the patella, and acute hematoma in the suprapatellar bursa. One day after the accident, the patient underwent surgery with primary repair of both quadriceps tendons. His legs were then immobilized in full extension by tutor casts for 6 weeks. The injury was suspected to be associated with the polyneuropathy as the patient had no other identifiable risk factors.

Conclusions: The quadriceps tendon is an inherently very strong structure that is extremely resistant to heavy load (3). The tendon can rupture spontaneously or as a result of trauma. The most common cause of simultaneous bilateral quadriceps tendon rupture appears to be either fall (4), or a sudden, violent eccentric contraction of the quadriceps mechanism against the body weight, with the knee slightly flexed and the feet in a fixed position (2) (3). The commonest site of rupture is the osseotendinous junction (4).

Early diagnosis in quadriceps tendon rupture is important, because a delay in treatment can result in considerable morbidity; tendon retraction, fibrosis, and atrophy reduces the possibility of successful operative repair (5).

Plain radiographs of both knees revealed a calcified opacity superior to the patella, eventual result of chronic tendinopathy (3).

Ultrasound is an inexpensive, sensitive, simple and reliable method in diagnosing tendon ruptures, whether partial or complete, at the bedside. This technology could show with high degrees of sensitivity and specificity the bilateral lesion in the quadriceps tendons.

Key words: quadriceps tendon, rupture, polyneuropathy, ultrasound, X-Rays

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EFFECTIVENESS OF MESOTHERAPY IN MUSCULOSKELETAL PAIN SYNDROMES

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Introduction: Mesotherapy is a minimally invasive procedure that consists of local intradermal therapy with pharmaceutical or other bioactive substances given in small quantities through dermal multi-punctures, where the injection site corresponds to the area of the pathological condition. The goal of this study was to evaluate the patients' satisfaction and the efficacy mesotherapy in the treatment of musculoskeletal pain syndromes.

Materials and methods: We selected a convenience sample consisting of 33 patients with painful musculoskeletal syndromes refractory to conventional treatment, who attended the mesotherapy attended outpatient mesotherapy consultation between January and December 2012. Patients were evaluated before and after treatment by numerical pain scale (END) and were subsequently contacted by telephone to assess the degree of satisfaction through a Likert scale.

Results: Most of our patients were females (93.9%) and the mean age was 58.12 ± 22.12 years. Thirteen patients (39.4%) had neck pain, 9 patients (27.3%) low back pain, 8 patients (24.2%) tendinitis and 3 patients (9.1%) had other complaints. The average END before treatment was 7.36 ± 1.45 , and after mesotherapy was 4.97 ± 1.6 , with a decrease in the END of 2.39 ± 1.64 ($p < 0.01$). After the treatments, it was found that 12 patients (36.4%) decreased analgesia or anti-inflammatory medications. Twenty-two patients (66.7%) considered the treatment to be effective and 27 patients (81.8%) would repeat the treatment if necessary.

Conclusions: Although there was been no complete remission in this sample, mesotherapy appears to be effective in reducing the perception of pain in patients with refractory musculoskeletal pain syndromes.

Key words: mesotherapy; musculoskeletal pain syndromes

EFFICACY OF TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION AND EXERCISE ON PAIN AND FUNCTIONS IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Introduction: Various treatments are suggested for the chronic low back pain (LBP), from active physiotherapy, joint manipulation, to the different types of physical agents. Still, there is no consensus about the optimal therapeutic approach. A recent focus in the physiotherapy management of patients with LBP has been the specific training of muscles surrounding the spine (deep abdominal muscles and lumbar multifidus), considered to provide dynamic stability and fine control to the lumbar spine.

The aim of this study was to evaluate the therapeutic effect of TENS and specific exercise therapy in patients with chronic low back pain.

Materials and methods: The study included 44 patients (24 male, 20 female, age 45±6.3 years), with the low back pain (LBP) symptoms without pain extension into the lower limbs, persisting over 3 months, with the pain intensity maintained at a stable level with oral nonsteroidal antiinflammatory drugs (NSAIDs). Patients were randomly assigned to one of three groups, and treated with TENS – 20Hz, 15 minutes duration (group A, n=15), or exercise therapy - specific exercise treatment program involving the specific training of the deep abdominal muscles, with co-activation of the lumbar multifidus proximal to the pars defects (group B, n=15), or received NSAIDs with no physiotherapy treatment (control group C, n=14). TENS and exercise therapy were applied daily, 5 days per week, during 3 consecutive weeks. The effects of therapy were evaluated by means of pain assessment (a 10-cm visual analog scale VAS; 0–10, where 0 is no pain and 10 is the worst pain ever), lumbar mobility measured by the Schober measurement, and disability measured with the Oswestry disability questionnaire, on admission to the study, after 3 weeks of therapy, and 6 weeks after the end of therapy.

Results: No adverse effects were observed during the treatment. Treatment with both TENS and exercise therapy caused significant pain reduction ($p<0.01$) and improvement of lumbar mobility ($p<0.05$), compared with control group, but with no significant differences for any outcome between the exercise therapy and TENS group after 3 weeks of therapy. The specific exercise group showed statistically significant greater reduction in pain intensity and functional disability levels at a 6-week follow-up compared to TENS group. At the end of follow up period no significant difference was observed between patients treated with TENS and non-treated patients.

Conclusions: Both TENS and exercise therapy are effective methods in reducing pain and functional disability in the therapy of chronic LBP. In chronic LBP specific exercise therapy is more beneficial than TENS or NSAID in the long term.

Key words: Low Back Pain, TENS, Exercise Therapy

THE OSWESTRY DISABILITY INDEX (ODI) AS EVALUATION TOOL OF OUTCOME IN PATIENTS AFTER LUMBAR DISC SURGERY THREE MONTH FOLLOW UP

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Introduction: Almost 80% of people, at least once in life, have back pain with or without leg pain. Lumbar disc herniation is in 95% of cases cause of lumbar radiculopathy. In about 10% of these patients there are indications for surgical treatment.

Aim of this study was to determinate the effect of surgical treatment of lumbar disc herniation on activities of daily living through Oswestry Disability Index (ODI).

Materials and methods: Prospective, clinical study included 30 patients with lumbar discectomy, operated in Clinic for Neurosurgery, Clinical Center of Serbia. We used ODI, in serbian language, with the patients filled before operation, one month after, and three months after lumbar disc surgery. All patients were included in early rehabilitation treatment of the algorithm of Clinic for Physical medicine and rehabilitation, Clinical Center of Serbia. After they release from hospital they conduct recommended kinesitherapy program at home. All 30 patients were in rehabilitation, in stationar institution specialized in rehabilitation, duration of 21 days, one month after operation. Student's t test for paired samples is used for statistical data analysis.

Results: 16 (53,3%) patients were women, and 14 (46,6%) were male. Average was 31,5 years old. Average ODI were 51,8% before operation, 24,8% one month, and 16,7% three month after operation. 29 patients (96%) had significant improvement regarding test results which include preoperative data and data on first checkup, a month after operation, and only one patient had worse results. Two months after first checkup, and stationary secondary rehabilitation, 25 patients (83,3%) showed new improvement on second checkup compared to results from first checkup. For reliability coefficient $\alpha=0,05$ there is statistical significant difference between data collected in preoperative period and on first checkup and also between data collected on first and second checkup.

Conclusions: Well done surgical treatment, and timely measures of early and secondary rehabilitation lead to improvement in patients after lumbar discectomy three month follow up which is shown by ODI, the 'gold standard' of low back functional outcome tools.

Key words: Oswestry Disability Index, lumbar discectomy, early rehabilitation

**EVALUATION OF SPECIFICITY AND SENSITIVITY OF CLINICAL TESTS THROUGH THE
ELECTROPHYSIOLOGICAL DIAGNOSIS OF SCIATICA**

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Introduction. Sciatica is defined as pain in the distribution of the sciatic nerve caused by pathological changes of the nerve. Common clinical signs of sciatica are painful thrust vertebra (Bell), limited anteflexion (Schober), painfully raising stretched legs (Lazarevic), dropout dermatome, miotoma or reflexes. EMG of the lower extremities is objective and highly reliable diagnostic method for testing suspected sciatica.

The goal: Define sensitivity and specificity of clinical tests that indicate the existence of sciatica, diagnosed by EMG examination.

Patients and methods: The basic sample consisted of 100 patients of both genders, aged between 20 and 65 years. Inclusion parameters for participation in the study were severe pain in the lower back with the expansion to one or both feet for a period of one to three months and clinical features that clearly suggest the existence of radicular lesions. Clinical examination was performed immediately before the electrophysiological study, which is a common practice. Electrophysiological confirmation of acute sciatica involved the registration of acute denervation in the studied muscles and long polyphase motor unit potentials in the percentage greater than 30%. **Results:** The random sample, balanced by gender (50 women, i.e. 50%). As for age, the mean was 50.0 (SD 10.7) years. EMG examination has electrophysiologically proven acute radiculopathy in 64 patients. The most common clinical signs in the total sample of patients with a clinical picture ischialgia are Shober's test (61%) and Lazarevic's sign (57%). Three clinical trials have shown significant relation to electrophysiologically verified sciatica, through statistical analysis: positive test Lazarevic, paresis of certain muscle groups, and the absence or reduction of the patellar and Achilles reflexes. Positivity of four or more clinical trials was statistically the best threshold with specificity of 67% and sensitivity of 56%.

Conclusion: Diagnosis of sciatica is primarily clinical and is based on characteristic clinical trials.

TRIGGER FINGER TREATMENT: EFFECTIVENESS OF STEROID INJECTION

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Introduction: Flexor stenosing tenosynovitis or trigger finger is a frequent source of pain and disability of the hand. The aim of this study is to access effectiveness of the treatment of trigger finger with steroid injection into the flexor tendon sheath at the A1 pulley.

Materials and methods: The medical files of a cohort of patients with trigger finger submitted to steroid injection into the flexor tendon sheath were reviewed. Patients diagnosis over a period of 62 months since January 2008 were considered. 75 patients with a total of 94 trigger digits were included. The fingers were injected into the flexor tendon sheath at the A1 pulley. 8 fingers were injected with 0.5 mL of methylprednisolone (40mg/mL) and 1 mL of lidocaine 1% and 86 fingers with 0.5mL of triamcinolone and 1 mL of lidocaine 1%. The minimum considered follow up was 3 months. The outcome measures were cure, relapse and surgery due to pharmacological failure. Factors associated to outcome measures were explored by univariate analysis.

Results: 75 patients were included (60 females), mean age 63.95 years (± 10.33), age ranges 31 to 87 years in females and 47 to 86 years in males. 63 patients were treated for single digit and 12 for multiple digit involvement. The fingers most frequently affected were the thumb (n=38) and the middle finger (n=28). Most of the fingers were from the right hand (n=51). Cure with a single injection occurred in 77.7% (CI95% 68.4-85.2), relapses in 20.2% (CI95% 13.0-29.2) and surgery was required in 2 fingers from different patients. Cure occurred in 80.2% (CI95% 70.8-87.6) of patients treated with triamcinolone and 50% (CI95% 18.4-81.6) with methylprednisolone (Fisher's exact test $p=0.071$). There was no statistically significant difference in terms of effectiveness between the different fingers affected. The cure rate ranged from 65,2% to 100% for the different fingers (n.s.). No associations were found between cure and number of affected fingers or diabetes. No complications were registered.

Conclusions: The success rate of steroid injection for treatment of trigger finger was high and surgery was seldom required. Triamcinolone may be more effective than methylprednisolone. No predictors of failure were found. The technique was safe when executed by experienced clinicians. Further studies are necessary to clarify which steroid may have better outcome and witch factors may influence outcome.

Key words: trigger finger, steroid injections, effectiveness, cure, relapse

LONG TERM FOLLOW-UP OF COMPREHENSIVE PHYSIOTHERAPY FOLLOWING DISC HERNIATION SURGERY: RESULTS OF A RANDOMIZED CLINICAL TRIAL

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Introduction: Hitherto no comprehensive long-term follow - up data of 10 years and more have been obtained from survivors of disc surgery that would have considered the type of postoperative care. Thus this study aimed at evaluating the long-term effects of postoperative comprehensive physiotherapy starting 1 week after lumbar disc surgery.

Materials and methods: This is the 12 years' follow-up of a three-armed, randomized, controlled, single blinded clinical trial which took place at an outpatient department of PM&R. Of 111 patients following first-time, uncomplicated lumbar disc surgery who participated in the original study and completed the treatment originally allocated, 74 (67%) completed a 12 years follow-up examination. In the original study, patients had been randomly assigned to "comprehensive physiotherapy", "sham intervention" (neck massage), or no therapy. The main outcome measure was the Low Back Pain Rating Score (LBPRS; Manniche 1993).

Results: At 12 years after surgery, the group undergoing "comprehensive physiotherapy" had significantly better functional outcomes as rated on the LBPRS than the untreated group (mean difference: 13.2 (p=.04). Equally, there was a clinically relevant, almost statistically significant difference between the sham therapy and no therapy (mean difference: 12.5, p=.07). A second sensitivity intention to treat analysis including all patients originally assigned with the last available observation carried forward revealed similar results. No clinically relevant and/or statistically significant between - group differences were found for secondary outcome parameters.

Conclusions: Physiotherapy following lumbar disc surgery may produce long-term health benefits over no intervention, but may not be superior to "sham". One might speculate that "comprehensive physiotherapy" may act through specific and other, non-specific effects in these patients. As postoperative physiotherapy was not superior to a "sham" intervention, professional guidance during the course of postoperative recovery by a clinician seems of utmost importance.

Key words: disc herniation surgery, physiotherapy, exercise therapy, randomized, long-term follow-up

WALKING WITH PROSTHESIS ONE YEAR AFTER LOWER LIMB AMPUTATION OF NONTRAUMATIC ORIGIN

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Introduction: The rehabilitation of patients after lower limb amputation has two goals: achieving functional mobility with prosthesis and successfully integrating the patient into the community. Upon discharge from acute rehabilitation center, most lower limb amputees of nontraumatic origin can functionally walk with prosthesis and some kind of walking aid. However, the maintenance of the ability to walk at the patient's home environment following discharge remains unclear. In the current study we aim to find if patients with nontraumatic lower limb amputation, ambulating with prosthesis at discharge from orthopedic rehabilitation ward, are still using the prosthesis one year later. Our results can clarify whether lower limb amputees of nontraumatic origin are preserving their ability to walk at their home environment within the community.

Materials and Methods: Hospital records of 79 amputees of nontraumatic origin, rehabilitated in the orthopedic rehabilitation department at the Loewenstein Hospital Rehabilitation Center within the last 3 years were analyzed. Age, gender and the main basic medical problem which was the reason of the lower limb amputation, were recorded. Walking ability was analyzed in all patients prior to their discharge from the ward. Patients were invited to visit an outpatient clinic 1 year after discharge, where their walking ability and use of prosthesis at home were analyzed.

Results: 75% of the patients were male; their mean age 62.8 ± 1.3 years. Only 7% of the patients were employed and 83% required some kind of assistance in everyday activities at the moment of amputation. 80% were diagnosed as diabetic patients and 55.7% had peripheral vascular disease. Most of lower limb amputees were at bellow knee level (67%), 30.5% - above knee and only 2.5% - foot amputees. The reason of the amputation was diabetes in 68% of cases and peripheral vascular disease in 20%. The discharge destination for most patients was their home (96%) and they were ambulating functionally in 95% of cases (64% with walker, 30% with cane or crutches and 1% without walking aid). The best predictors of functional walking at discharge according to ordinal regression model are the age of the patient ($p = 0.0059$) and the existence of diabetes ($p = 0.017$). All patients were invited to outpatient clinic one year (372.6 ± 47 days) after discharge, but only 34% (27) of them visited the clinic and were investigated. 81% of patients reported regular use of prosthesis at home while visiting the clinic. They were also checked by a rehabilitation doctor while walking with prosthesis in the clinic. 45% of patients were walking with walker, 18% - with cane or crutches and 18% without walking aid.

Conclusion: Most of the patients admitted for prosthetic rehabilitation after nontraumatic amputation were unemployed and requires some assistance in everyday activities. Most frequent reasons of nontraumatic amputations are diabetes mellitus and peripheral vascular disease. The inpatient prosthetic rehabilitation program succeeded in most of the patients and the result is preserved one year after discharge from the orthopedic rehabilitation ward. The quality of walking even seems to improve during one year of home prosthetic training. This finding is important in planning the acute prosthetic rehabilitation process for nontraumatic lower limb amputees.

Key words: orthopedic rehabilitation, lower limb amputee, walking with prosthesis

OSTEOARTHRITIS OF THE SPINE AND RISK FACTORS

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Introduction: Osteoarthritis (OA) is a common disease that affects articular tissues, causing progressive irreversible damage and the failure of the joint. Pathological changes in OA include also subchondral bone thickening, osteophyte formation and synovial inflammation, which can lead to disability. In addition to the hips, knees and lower back, OA occurs in the neck as well. Spinal OA is one of the common causes of back pain (Horvát et al, 2011). The obesity showed strong link with OA in multiple studies (Coggon et al, 2001). The prevalence of OA increases with age. Relationship between obesity, gender, and degenerative changes in the spine varies in different studies and countries (Zukowski et al, 2012).

Objective: To determine the association of spinal OA with obesity, gender and age within adult population of Banjaluka region.

Materials and method: The study included a retrospective analysis of 7089 medical records of patients with established diagnosis of OA. We used the electronic data base of primary care and CBR units of our region from Jan 2005 till Dec 2010. This study is part of larger epidemiological survey on prevalence of OA and obesity in our region. Diagnosis of OA was based on clinical symptoms, physical examination and X-rays. Analyzed parameters were: age, gender and body mass index (BMI) in patients with OA. The obesity was classed as BMI>30.0 kg/m² (NIH, 2009). The baseline characteristics of the participants are presented as means (SD) and/or numbers (percentages) in relation to BMI and age. Association between OA and BMI, and OA and age were assessed by a che-square test with significance treshhold of 0.05. All statistical analyses were performed using SPSS software version 15.0 (SPSS Inc.2006).

Results: Out of 7089 patients with OA (mean age 50.6 ± 14.2; age range 19 to 91), the number of spinal OA was 5918, with significant increase with age (p<0.01). The number of cervical OA was 1211 (65.2% in women and 34.8% in men; $\chi^2 = 0.48$; p>0.05). Lumbar OA was presented in 4707 participants (52.6% women and 47.4% men; $\chi^2 = 39.66$; p<0.01). Obesity was most evident at age >50 years. From a total of 1787 OA in obese subjects, percentage of spinal OA was 77.9%. The correlation of obesity and lumbar OA was statistically significant ($\chi^2 = 18.9$; p<0.01). No statistical significance was found with obesity and cervical OA ($\chi^2 = 3.6$; p>0.05).

Conclusion: Aging and female gender have a high statistical significance in the development of OA at all sites (p<0.01). There was a high statistical significance between obesity and OA of lumbar spine (p< 0.01), but not with obesity and cervical OA (p>0.05). A significant increase in the prevalence of OA was observed in women during menopause.

This information can be used pragmatically by PRM specialists and family doctors to construct plan for screening, counseling and referring adults with overweight and OA to appropriate obesity prevention and treatment.

Keywords: osteoarthritis (OA), spine, obesity

O – 021

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INPATIENT FUNCTIONAL RESTORATION IN LOW BACK PAIN DISABILITY

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Introduction: Various functional restoration programs are available for persons with chronic low back pain disability (CLBPD), most of them for outpatients.

Materials and methods: The functional outcome of the Loewenstein inpatient CLBPD functional restoration program was evaluated retrospectively. One hundred CLBPD patients with primary ADL deficits (in ambulation, daily activities in sitting and standing positions, washing and dressing lower body), admitted for rehabilitation during 2000-2009, were included. Exclusion criteria were spinal surgery during the 6 months before admission to rehabilitation, neurological deficit with AIS grade A, B, or C, and non-spinal medical problems that may cause disability. Function was assessed using a modified SPIM scale (score range 0-82).

Results: The mean value of functional status at admission was 59% of the maximum allowed by the SPIM scale (49/82). During the rehabilitation program the score improved by a maximum of 84% (41 points) and by 18.6% (9.07 points) on average. The improvement in function correlated positively with a length of stay in rehabilitation (LOS) of up to 60 days, and negatively with the admission SPIM score ($p < 0.001$). No significant correlation was found between SPIM gain and AIS grade, pain relief, use of narcotic drugs, and an open compensation claim.

Conclusions: The restoration program achieved a significant functional improvement in many of the most difficult CLBPD patients. Patients with initial severe disability improved more than those whose initial functional condition was higher, and additional stay in rehabilitation, of up to 60 days, resulted in further improvement. Pain relief or external factors that may influence pain or motivation did not affect the functional restoration. The Loewenstein inpatient CLBPD program is recommended for patients with LBP and a significant primary ADL deficit.

Key words: Low back pain disability, functional restoration, inpatient rehabilitation program

LOW BACK PAIN AND ABSENCE FROM WORK – CAUSE OR A CONSEQUENCE

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Introduction: Chronic low back pain (CLBP) is not just the same as acute back pain lasting longer, but the result of a complex interplay of physical, psychological and social factors. It is estimated that 60-70% of patients with LBP recover by 6 and 80-90% by 12 weeks. However, recovery after 12 weeks is slow and uncertain and it is followed by long lasting absence from work. After two years of absence from work, the return rate is close to 0. Aim of this study is to demonstrate the interdependence of chronic back pain and absence from work and to emphasize the importance of early return to work activities.

Materials and methods: Prospective study was conducted in our Clinic from October 2011 till January 2013. From 754 patients with low back pain, 180 had back pain that lasted longer than 12 weeks. 100 (46 female; 54 male) were active and did not stop working before and throughout the therapy. 80 patients (42 female, 38 male) were absent from work (68 unemployed: 24 never worked, 34 lost a job in past three years, 10 without job for longer than 3 years; 8 on a seek leave and 5 retired). Patients had individually designed and conducted exercise program. Results were gathered using SF-36, VAS pain, Oswestry Disability Questionnaire, Fear Avoidance Questionnaire, Tampa Scale of Kinesiophobia and Beck's Depression Inventory.

Results: Before and after the therapy results were significantly better in patients that stayed active all the time. Pain was reduced and functional performance increased significantly: VAS before the therapy = 8.01 ± 2.11 ; after = 4.58 ± 1.27 ; ODS before the therapy = 35.28 ± 7.56 ; after = 23.44 ± 8.89 ($p < 0,001$). Also, BDI scores were much lower in this group. The situation was different in the group of patients who were not working during the active physical treatment: VAS before the therapy = 8.12 ± 1.14 ; after = 7.13 ± 1.70 ; ODS before the therapy = 37.10 ± 12.01 ; after = 32.83 ± 11.24 ($p < 0,001$).

We must stress out that people who were unemployed had higher incidence of comorbidity (neck pain: 49 patients, hip pain: 19; high blood pressure: 27, verified depression 15). Majority of those who lost their job in past three years (27 /34) stated that they never had back pain while they were working, and 16 of them had more than three visits to the doctor because of their back pain during last year.

Conclusions: Better therapy results and absence of co-morbidity and depressive feelings in a group of patients who were not on a seek leave that lasted longer than few days, once again proved us that we must encourage our CLBP patients to return to work as soon as possible, and also to treat those unemployed with some severe cognitive-behavioural therapy to minimize depressive feelings and avoidance behaviours.

Key words: low back pain, absence from work, exercise

USE OF ICF IN DESCRIPTION OF CAREGIVERS ADAPTATION AFTER SEVERE BRAIN INJURY

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Introduction: After discharge from rehabilitative center, families become the “hub of care” for patients with a severe brain injury. Despite this, a description of single problems of families still remains unclear in the literature; The International Classification of Functioning, Disability and Health (ICF) can describe spectrum of problems relating to assistance, help health professional and social policies to highlight and report these problems in comparable and measurable data.

Materials and methods: We conducted a retrospective study on families of patients with SBI, discharged from our rehabilitation unit between October 2009 and June 2011. A specific questionnaire has been administered with a semi-structured telephone interview to the relatives of discharged patients. The answers were translated in ICF categories and we analyzed codes involved in changes more frequently. Correlations between ICF codes and variables of patients and relatives were calculated with Chi Square test and Mann Whitney test.

Results: We included 26 patients with a severe brain injury (12 with vascular etiology, 8 anoxic and 6 traumatic), mean age 56 years (SD of 18.52yy), 16 males and 10 females. At the time of discharge 19 patients came back home. The questionnaire showed that: 11 relatives (57,89%) have changed home or made structural home modifies (d610); 17 (89,47%) had reduced time for hobbies or recreational activities (d920); 7 (36,84%) had changed or modified type of work (d845); 10 (52,63%) experienced a lack of relationship with friends (e320); 16 (84,21%) assumed persons for patient or home care (e340); 17(89,47%) had professional health care at home. Patient's age, number of caregivers and length of stay in rehabilitative center correlate with variations in several ICF categories.

Conclusions: The loss of social network, the reduction in recreational activities and in friendship relations or changes in employment is common problem among families after discharge of a patient with SBI. Furthermore, relatives experience financial difficulties related to needs for long term home care. Our data suggest that number of caregivers and age of patients should be considered to giving information to relatives and community services about planning discharge at home.

Key words: ICF, caregivers, severe brain injury, home setting

THE HOSPITAL INFORMATION SYSTEM IASISNET

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Introduction: 2 years ago Data Design SA, a Greek company specialized in Medical Informatics, undertook a project to develop an information system capable to support all the activities into a new Rehabilitation Center in Thessaloniki, EUROMEDICA Arogi SA.

We will examine how a Hospital Information System (HIS) is involved in all medical and non medical procedures in rehabilitation.

Materials and methods: After over 2 years of uninterrupted operation, it is produced a huge capacity of materials, data and statistics for about 3450 patients. The program is the specific HIS, called IASISNet. Beyond the data, we collected many evidences such as pictures of pressures sores, treatments and surgery wounds. Access to this program have all staff members such as nurses, physicians, therapists, physiatrist. All procedures are recorded from initial assement of nurses, medical doctors and therapists, to the notes of the team meeting.. “Medical memos”, “directions” and “Functional Independence Measurement (FIM)” are only some of the innovative elements of IASISNet, which are combined with the classical medical treatment in order to achieve the highest results to the rehabilitation procedures.

Results: At the moment we have full data from 3450 patients with initial assessments, team meetings medications, vital signs, laboratory results are all in the program. Also photos of wounds, surgery trauma, and medical procedures (acupuncture, intraarticular injection etc) are all available. The information system stores all data needed for retrospective studies. The program also organizes the timetable of the therapists and nurses. Each patient has his weekly therapeutic schedule printed out from the system. Even in case of cancellation of the therapy, is evident to the system the reason for it.

Conclusions: The example of rehabilitation center EUROMEDICA AROGI, which accommodates about 220 internal patients and up to 300 out-patients daily, can easily describe a success story of the functionality of an HIS in the complicated and demanding environment of a rehabilitation center. All these capabilities of IASISNet create a complex net of information which in the right hands consist a unique tool for the medical staff of an institution, helping in organizing with surgical accuracy the entire patient therapy, simplifying all process and achieving the best results rapidly.

Key words: Rehabilitation Information system, data collection

**FUNCTIONING AND DISABILITY IN AMYOTROPHIC LATERAL SCLEROSIS
REHABILITATIVE PROJECT: ROLE OF ICF CLASSIFICATION**

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Introduction: The purpose of this study is to highlight the functional effects that Amyotrophic Lateral Sclerosis (ALS) has on the functioning of patients and to identify the most critical areas of rehabilitation, using the ICF (International Classification of Functioning, Disability and Health). **Materials and methods:** We recruited patients resident in Umbria, Italy, with a diagnosis of ALS who was monitored from March to September 2011. To assess the functioning of patients we used 19 ICF items taken from the questionnaire WHO DAS 2 2000, assigning a score from 0-4 for ability and performance, when these were completed a statistical analysis of the collected data was carried out.

Results: We recruited 20 patients with ALS (12 males and 8 females), with a median age of 65 years (range 42-80 years) with different ALS forms at various stages of the disease. The mean multidisciplinary follow up time was 1291.75 days (range 60-5170). The disability areas were: "Remunerative employment" and "doing housework" (median score 4), "dressing" and "washing" (median score 4). The items performance using facilitators were: "wash"(100%), "dress"(100%), "sit down"(80%), "move around the house"(70%), "eating"(60%), "move to different locations"(60%), while performance was essentially unchanged in the items: "paid employment"(5%), "economic life"(5%), "managing tension"(10%), "life in the community"(25%), "doing housework"(25%).

Conclusions: The facilitators make a difference in the areas of movement and personal care while performance is lower in daily activities and social life. The ICF can highlight the critical issues which will need more attention with a targeted rehabilitation project.

Key words: ICF, Amyotrophic lateral sclerosis, rehabilitative project

COMORBIDITY IN SUBJECTS WITH LONG-STANDING SPINAL CORD INJURY

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Introduction: There have been substantial improvements in survival after spinal cord injury (SCI) in the last several decades. As medical care advances provide great contribution to increase life expectancy of people with SCI, research focus on aging and long-term consequences that impact their lives. Subjects with chronic SCI often experience complications and problems related to their disability. The aim of this observational study is to explore the prevalence of comorbid conditions among subjects with long-standing SCI and to find out prevention strategies.

Materials and methods: The study population included 50 subjects with paraplegia or tetraplegia of more than 25 years duration from the Centre for Paraplegics in Ostia Lido outpatient department observation.

Results: 50 subjects (3 women, 47 men), mean age was 61.78 years (range 50-81) and year since injury was 28.56 years (range 25-51). Prevalence of comorbidity was: hypertension 44%, renal cysts 30%, lithiasis 34%, traumatic bone fracture 16.5%, spinal deformities 28%, pressure ulcer 74%, diabetes 20%, carpal tunnel syndrome 10%, rotator cuff lesion 10%, HCV positive 10%. We observed less comorbidity between subjects practicing sport at high level, it was 14%.

Conclusions: As shown in these results, prevalence of comorbidity in subjects with chronic SCI is high. Authors underline the need to improve knowledge on this topic to provide a comprehensive approach to long term follow-up, focusing on disease prevention and emphasizing the crucial role of caregiver's competence who also age with aging SCI becoming less able to provide care.

Key words: aging, SCI, comorbidity, sport practice, caregivers

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GENERAL PRINCIPLES OF EXERCISE PRESCRIPTION

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Introduction: The physical activity has multiple benefits, regardless of age, sex, state of health. Physical activity in children promotes socialization among pairs, educates healthy lifestyles and promotes the gain of physical skills. In adulthood it promotes the maintenance of health and prevention of various diseases. In the elderly promotes the maintenance of independence and is in the 1st line of approach to numerous pathologies.

Materials and methods: PubMed search through the Mesh terms, using the key words “physical activity”, “health status”, “exercise prescription”.

Results: There is clinical evidence of an inverse relationship between physical activity and cardiovascular disease, osteoporosis, diabetes, obesity, cancer, anxiety, depression. Physical activity is recommended as first-line approach in the prevention of various diseases, as well as the first - line therapy of multiple comorbidities. A training program will be more successful if it is prescribed taking into account the person as a bio-psycho-social one.

Conclusions: Exercise prescription expected to become increasingly individualized and appropriate to the aims pursued and existing comorbidities. A method of prescribing physical activity obeys the method FITT (F - frequency, I - intensity, T - time, T - type modality).

Key words: “physical activity”, “health status”, “exercise prescription”

THE FORCE FEEDBACK INSTRUMENT: A TOOL FOR THE ASSESSMENT OF THE EFFICACY OF THE MULTI-PAD ELECTRODE ELECTRICAL STIMULATION AND FEEDBACK FOR CLOSED LOOP CONTROL

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Introduction: Functional Electrical Therapy (FET) is the technique which assists intensive exercise during post-stroke recovery. The repetition of natural-like movements, typical for daily activities has been reported to improve the recovery of patients. In addition, providing longer functional therapy sessions enables faster functional improvement of impaired limbs. The major difficulty in the implementation of the FET comes from the insufficient selectivity of functional electrical stimulation for generating movement, fast occurrence of muscle fatigue, and inadequate control paradigm. For overcoming these obstacles we designed stimulation system based on multi-pad electrodes which, as reported in our recent publications, produces selective and fatigue resistant stimulation. In order to assess the efficacy of the new system in the grasping tasks, we designed an apparatus for grip strength measurement in form of a standard bottle. The same device can be used for feedback control (control of the elicited muscle force) during functional tasks.

Materials and methods: Electrical stimulation was done using INTFES ver. 1 system comprising multi-pad electrodes and stimulator which controls both, electrode pad activation and corresponding stimulation parameters. Optimal electrode configuration (active pads and current pulse parameters) for the palmar grasp is defined in electrode calibration protocol described elsewhere. The new apparatus for grip strength measurement, in form of 0,5 l bottle, was employed as object for manipulation and feedback device. Measurements were conducted in healthy subjects with the same sensorized bottle and used later as the reference of a force in patients. The feedback is used to minimize the force; yet, keep at the level which guarantees the firm and stable grasp. In this way, we can generate the grasp while avoid fast occurrence of muscle fatigue due the reduced stimulation intensity and slower saturation of the muscle reserves.

Results: Our results present range of forces that healthy subjects produced while manipulating with 0,5 l bottle. Stimulation protocol achieved to find pads for stimulating palmar grasp. By modifying stimulation amplitude, we can set desired grip force in range of those recorded on healthy individuals. When comparing forces elicited in open loop stimulation and target forces, which can be produced with sensory feedback, decrease of 24% in generated force can be achieved, thus, delaying occurrence of fatigue and prolonging FET sessions.

Conclusions: Our methodology was designed with intention to produce optimal palmar grasp for prolonged FET sessions. Measurements on healthy subjects provided us baseline data needed for optimizing grip force on hemiplegic patients using electrical stimulation. The new bottle alike sensor is a very functional accessory that can be used during the setup of electrical stimulation, in our case integral part of the stimulation system based on multi-pad electrodes.

Key words: grasping force, electrical stimulation, selectivity, muscle fatigue

OPTIMIZATION OF ACTIVE PADS ON A MULTIPAD ELECTRODE FOR SELECTIVE FINGER MOVEMENTS BASED ON ACCELEROMETER DATA

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Introduction: Functional electrical therapy (FET) integrates intensive exercise, functional electrical stimulation and motivation to relearn object manipulation and grasping that are missing as a consequence of central nervous system (CNS) injury. Results suggest that FET has favorable carry over effects on rehabilitation of upper extremities and thereby it is a valuable therapeutic method. Previous studies showed that the system based on new intelligent array electrodes and asynchronous stimulation allows selective and low fatiguing activation of paralyzed muscles. Aim of this study is to find a method that would allow fast selection of active pads on multipad electrode in order to produce selective finger movements and natural like grasping.

Materials and methods: Five healthy volunteers participated in this study (Age 27±3). One of two multipad electrodes was placed on volar and other one on dorsal side of the forearm, 5 cm below the elbow and 1 cm apart from the line connecting medial epicondyle and ulnar styloid process. For stimulation we used INTFES stimulator (Tecnalia, Spain) and irregular 4x4 matrix electrode that was designed in respect to nerve and muscle layout on the forearm of hemiplegic patients. Stimulation frequency was set to 30Hz and the pulse width was set to 250µs. Range of currents for the optimization process was selected manually, and every pad of the array electrodes was activated with 1mA increment of amplitudes in the predefined range. Amplitude ranges used in this study were 12±2mA for flexion and 14±2mA for extension. Four accelerometers were placed on fingertips of the thumb, index, middle and ring finger in order to measure the movements produced by stimulation and one accelerometer was placed on the dorsal side of the palm in order to measure the wrist movements. For all stimulation positions (16 pads for flexion and 16 for extension) we calculated maximal produced movement and sorted them in descending order. Finally, active pad patterns for grasp generation were determined based on Teager energy of the predicted summary movement when several pads are being activated. Combinations of active pads were made with minimum 2 and maximum 4 pads for each finger and the wrist movements were minimized in order to produce selective finger flexion/extension. In this process, adequate currents intensities for stimulation are also identified.

Results: The selectivity of stimulation was inspected visually, firstly by testing the stimulation response of the separate fingers and latter by applying stimulation patterns for grasp generation. Three types of grasps were tested: palmar, lateral and pinch. Duration of extension and flexion of individual fingers and the wrist in the grasping sequences was set in respect the literature. The presented active pad optimization protocol resulted with the proper muscle activation and functional grasp in more than 90% of trials. Grasps were not completely functional only in the cases when movement of some finger could not be produced by stimulation of any pad due to the inadequate electrode coverage of the forearm (in cases of too large or too small arms).

Conclusions: With the electrode design presented in this study we were able to produce selective movements for each finger and wrist and the pad optimization protocol was able to calculate adequate active pad patterns for natural like grasps. The time needed for the optimization protocol and the pad selection is less than 2 min and the grasping stimulation can start immediately after this stage is finished. The results of this study need to be verified in clinical environment in patients with CNS injury whose reaching and grasping abilities are limited.

Key words: Functional electrical stimulation, multipad electrodes, isolated movement, grasping

GAIT OUTCOMES OF SPASTIC EQUINUS FOOT COMBINED SURGICAL AND PM&R TREATMENT

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Introduction: Spasticity is one of the most prevalent sequels of upper motor neuron syndrome and the most disabling. Gait is the functional activity most frequently performed by humans throughout life, therefore, of utmost importance for their autonomy and quality of life. In patients with spasticity of different aetiologies, gait is impaired. In adults, the most common deformity of the lower limb is the equinus foot (EF), and the success of gait rehabilitation depends largely on its treatment or compensation. Gait analysis is useful both to detail the aims of surgery and give information to the surgeon that may help deciding the surgical procedures.

The goal of this paper was to present a series of patients with spastic EF (included in an observational on-going study), intending to demonstrate the outcomes of treatment, combining multimodal rehabilitation with different techniques and resources of PM&R and neuro-orthopedic surgery. Other objectives were: to evaluate gait velocity, the kinematic behavior of dorsi-plantar flexion of the ankle joint and dynamic behavior of the vertical component of the ground reaction forces (GRF).

Materials and methods: We conducted an observational, descriptive and retrospective study in eight cases of patients with spastic EF evaluated with gait analysis, before and after the combined multimodal treatment described above. We selected patients whose pre and post-operative records were complete, according to the gait laboratory routine protocol. They were 8 patients with spastic hemiparesis due to cerebral injury and spastic EF (5 males and 3 females). Etiologies were: 5 cases post-TBI and 3 cases post-stroke.

We tried to find a relation between gait velocity and: 1) the angle of ankle dorsiflexion during the single support phase of the affected limb; 2) the magnitude and inclination of the first peak of the vertical component of GRF (Fz) of the affected limb.

Results: There was a mean increase in velocity of 0.067 m/s (gait efficacy), concomitant with a reduction of the angle of equinus in single support (average of 14°); an increase of maximum value of GRF Fz measured as a percentage of body weight during load acceptance of the stance phase (average 10.7%); a slight decrease in duration of the load acceptance in the affected limb (average 1.4%).

Conclusions: Chronic stroke patients presenting with a spastic EF deformity can benefit from several therapeutic interventions. The gait laboratory was fundamental for pre-operative guidance and for the interpretation of the outcomes obtained with the combined treatment of PM&R and neuro-orthopedic surgery, as well as to explain the biomechanics of interdependent underlying mechanisms. This study is on-going, aiming to learn more and more about the most suitable options for treating stroke patients with EF.

Key words: Equinus foot, stroke, gait analysis, multimodal treatment, surgery

COMPUTER VISION SYSTEM FOR ASSESSMENT OF HAND MANIPULATION

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Introduction: The recovery of the functional use of upper limbs in patients after stroke is very important goal of rehabilitation requiring continuous follow-up of functional improvement. The most common method used to determine functional ability of the paretic upper limb - Wolf Test Motor Function- is not only subjective, it is a time demanding for both, the patient and the therapist. While patient performs a number of particular tasks, a therapist measures time and scores task performance. On the other hand, objective tests for assessment of the arm manipulation in patient are mostly limited to movements in the transverse plane, while stroke patients often have more difficulties moving the arm against the gravity. Further, these tests require setting up and calibrating sensors for each patient which is complex and time consuming. We propose a novel method based on the Kinect sensor and an algorithm that tracks the real world coordinates of the hand. This objective and simple approach (no attached sensors) may be used for evaluation, analysis and classification of upper-limb motor condition for any movement in patient's reachable space.

Materials and methods: Procedure that we developed enables tracking and estimation of hand position in real world from the Microsoft Kinect depth image stream. It is based on the computer vision and image processing algorithms that results with 3D coordinates of the hand position with time resolution of 15fps and estimation error that is less than 1cm. Ten young healthy subjects (6 female, 4 male) participated in the experiment. The task was to "draw" a circle with 10cm radius and a 10x20cm rectangle in frontal plane in outward and inward directions starting from the midpoint in the bottom of the figure. They were asked to perform movements in their own pace as precise as they could five times, with the right, then with the left hand, alternatively. The subjects had a visual feedback on a PC screen about their hand position in respect to the desired trajectory. The recorded movements were evaluated based on the distance from the hand reference point to the nearest point of the desired trajectory. For movement effectiveness criteria we adopted *Hand Coordination Parameter* (HCP) – a new measure which we defined as a sum of distances (90%) and standard deviation (10%), and calculated for each trial. HCP informs both the movement precision and the dexterity of arm.

Results: Results of the experiment on healthy subjects indicate that methodology based on computer vision for hand tracking and HCP can be used as an objective measure of movement performance. Our results show that this algorithm can distinguish between dominant and non-dominant hand for 80% of subjects when drawing a circle. This distinction was not so apparent in rectangle drawings, although the ranking of subjects in respect to their hand manipulation was still possible. Based on these findings, we can presume that presented approach may be adjusted for clinical applications in evaluation of hand manipulation.

Conclusions: A novel method for assessment of hand manipulation during user defined movements in frontal plane based on Kinect sensor and computer vision algorithms is presented. Experiment on 10 healthy subjects resulted in similar values of the HCP for both circular and rectangular movements. These values can be used for assessment of the paretic arm functionality as a reference for a functional hand. Our goal is to set a scale that will score the stage of upper-limb impairment and correlate it with commonly used clinical scales for stroke patients. It is important to emphasize that presented methodology does not require sensor attachment and that can be applied for evaluation and analysis of any 3D movement.

Key words: Stroke, Microsoft Kinect, assessment, hand tracking, real-world coordinates

**THE ROLE OF POLYMIOGRAFIC ANALYSIS IN THE QUANTIFICATION OF RECOVERY
AFTER SENSORS DRIVEN FUNCTIONAL ELECTRICAL THERAPY IN STROKE
PATIENTS**

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Introduction: This study presents a polymyographic analysis of the of the activation patterns in the control of movement in stroke patients treated with sensor driven FET. The aim of the study is to quantify recovery that underlies clinical improvement after the FET treatment.

Materials and methods: The recordings were performed at the initiation of the rehabilitation treatment and after it were completed. We asked subjects to perform dorsiflexion, as a goal directed activity. Subjects were asked to track the target line shown on the screen by dorsiflexion the foot in the sitting position. The target line was created individually and automatically for each subject. The target line connected the resting ankle joint angle (0 degrees) and 90% of the maximum dorsiflexion angle. The achieved dorsiflexion angle and the target line were displayed on a monitor that faced the subject. The max value was determined by averaging the recordings from 10 subsequent trials, in which subjects were asked to generate maximum dorsiflexion.

Results: The tracking of the target dorsiflexion angle (maximum angle was 9 ± 6 degrees) was delayed compared with the tracking after the therapy where the maximum angles reached values of 18 ± 4 , which is almost 80% of the values characterizing healthy subjects. Patients before FET had low graduation of TA EMG, and in general low activation of TA in parallel with the high activation of RF which is completely opposite compared with the healthy subjects. Patients after FET had steeper graduation of TA EMG and reached higher activation of TA, in parallel with low activation of RF. This synergy is much closer to the one characteristic for healthy subjects.

Conclusions: This research implies that that the facilitation of walking by sensor driven electrical stimulation provided better conditions for the cortical changes to take place during the early phase of post-stroke recovery, as compared to walking only.

Key words: Stroke, FET, polymyography

PHYSICAL AND REHABILITATION MEDICINE IN CROATIA

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Introduction: Although Croatia is a small country on the Mediterranean Sea, it has a hundred-year-old tradition in rehabilitation medicine. First rehabilitation facilities in Croatia were thermal resorts, which were the foundation for development of a large number of specialized rehabilitation centers. Also, in 1947, Croatian Society of Physical Medicine, Rehabilitation, Rheumatology and Balneology was founded, in 1967, Croatian Society for Rheumatology spun off as an independent society and since 2005 the society operates under the name Croatian Society of Physical and Rehabilitation Medicine. Since then, Society directs development of physical and rehabilitation medicine in our country.

Materials and methods: Critical collection and study of data on present state of physical and rehabilitation medicine in Croatia.

Results: At the moment, there are 1900 rehabilitation beds in Croatia, which is a high ratio of 0.42 per 1000 inhabitant, considering that the minimum recommended standard is 0.10. Croatia has the second highest ratio of physical and rehabilitation medicine (PRM) specialists per 100000 inhabitants among European Union of Medical Specialists (UEMS) member countries. Croatian Society of PRM, under current presidency of Prof. Tonko Vlak has steady membership of approximately 250 members and Board of 13, including one vice president, treasurer and secretary. We have included Board members from all Croatian regions, to keep the link with local PRM communities. Communications to members are done by regular e mails and through our web site www.hdfrm.com. CSPRM has regular meetings with lectures, the general assembly is held every year, elections every fourth year, as well as national congress.

CSPRM owns and published its journal Fizikalna i Rehabilitacijska medicina since 1984. CSPRM is an active member to European Society of PRM. Croatian Medical Association was accepted in UEMS in 1996 and in 1997 our representative joined UEMS PRM Section and Board.

Conclusions: Although some of these numbers are impressive, rehabilitation medicine in Croatia did not yet reach necessary standards. Rehabilitation medicine in Croatia needs to address many issues, such as increasing rehabilitation needs, abundance of PRM specialists and rehabilitation beds, as well as shortcomings in education, which is focused on rheumatology rather than rehabilitation. The existing traditional system of rehabilitation care can not satisfy the new standards set for quality and efficiency of rehabilitation medicine. Need for a change in Croatian educational and rehabilitation system was evident.

Key words: physical medicine, rehabilitation, Croatia

THE REHABILITATION IN JORDAN

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Jordan population around 6.5 millions, the disability form 5% of population, the main causes of disabilities are: trauma, diseases congenital, hereditary causes, beside eldary problems. For that the Jordan Government and local societies paid more attention to improve rehabilitation services and facilities for disabled persons. By national strategy for persons with disabilities by annulment of the welfare law for disabled persons, the development of the law on the rights of persons with disabilities and the creation of he higher council for affairs of persons with disabilities. For that the rehabilitation services have been developed in the last twenty years especially by the well trained physician as specialty fields of PRM under the umbrella of Jordan medical council. Also the paramedical staff in field of PT, OT, P.O, SPTH, under the umbrella of rehabilitation since college which belongs the Jordan universities to have Bachelor degree. Beside that Jordan developed rehabilitation services through medical rehabilitation centers at the big hospitals at middle north and south of Jordan and special department for SCI at military hospital. Also Jordan developed C.B.R at rural area

FUNCTIONAL CAPACITY EVALUATION IN PATIENTS WITH DIFFERENT FORMS OF MULTIPLE SCLEROSIS

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Introduction: Multiple sclerosis (MS) is a chronic progressive disease affecting young adults and leading to considerable disability in daily life. The common functional limitations and symptoms are associated with disorders of strength, sensations, coordination and balance as well as cognition, mood and vision disorders. The disease course is unpredictable and as result impairments and activity limitations can appear suddenly and progress over a time. The purpose of our study was to evaluate the functional capacity (FC) in MS patients with different forms of multiple sclerosis.

Material and Methods: We have evaluated 45 patients with diagnosed multiple MS that were referred to Clinical for Rehabilitation for treatment. Three forms were separately analyzed and patients were grouped into 3 groups: Group 1 included patients with relapse remitting form, Group 2 (N=15 patients) those with secondary progressive form and Group 3 included those with primary progressive form. For evaluation of functional capacity we analyzed further scales: EDSS scale, Ashworth scale, MSSS88 and Beck scales. The comparisons were made between different groups of patients within same scale.

Results: The most frequent form of MS in our study was primary progressive form with more than half participants (24 (53.3%) patients), while the least frequent was relapse remitting (6 (13.3%) patients). Secondary progressive form was noticed in 15 (33.3%) patients. There is significant difference in mean values for FC measured by EDSS between Group 1, Group 2 and Group 3 (EDSS: Group 1- 3.92 ± 0.67 ; Group 2- 5.27 ± 1.02 ; Group 3- 5.88 ± 1.14 , $p < 0.001$). Differences of mean values for FC measured by Ashworth scale ($p = 0.069$), MSSS88 ($p = 0.472$) and Beck ($p = 0.162$) scales were noticed as well but only significant difference persisted in FC measured by Ashworth scale between Group 1 to Group 3 (Ashworth: Group 1- 1.58 ± 0.49 ; Group 3- 2.46 ± 0.88 , $p = 0.027$).

Conclusion: Our results pointed out that most frequent form of MS is primary progressive. Further we have shown that changes in functional capacity measured by EDSS scale significantly varied between different forms of MS, same applies for functional capacity evaluation by Ashworth scale between relapse remitting and primary progressive forms.

Key words: multiple sclerosis, functional capacity, scales, adults

O – 037

Abstract No.: 13739170138152

SEXUAL ACTIVITY AFTER BRAIN INJURY – FEARS AND BELIEFS

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Introduction: This study aims to understand the beliefs and fears concerning sexuality in patients with brain injury (BI) admitted in a Rehabilitation Department (RD) and thus establish strategies for prevention, assessment and adequate intervention.

Materials and methods: We collected data for all patients admitted with a BI in a RD during December 2012, concerning demographic information. A questionnaire was made, with 18 questions to assess beliefs, fears and expectations of patients with sequelae of BI. Inclusion criteria: patients with BI and the ability to understand and respond to the survey. Exclusion criteria: patients not cooperating and / or confused, aphasia, previous sexual dysfunction. SPSS was used for descriptive and statistical analysis

Results: The sample consisted of 23 patients, 16 males, mean age 46 years. Diagnosis of admission: 13 patients with stroke and 10 with TBI. The majority of patients were sexually active before the injury, 26% think will never be able to have an active sex life again, 47.8% are much less interested in sex, 52.2% think physical changes prevent from having a fulfilling sex life, 34.8% don't have anyone else to discuss issues about sex and 30.4% stated would like to talk to someone about resuming sex. 87% denies feeling too old for sex, 73.9% denies fear of rejection and 68.2% denies feeling less attractive and his/her partner would not be interested in her/him. In general, patients manifest that if they wanted to talk to someone about their sex life they would prefer someone of the same sex. Of the stroke patients, 38.4% feared that sex would cause a another stroke. The youngsters have more fear than the elderly that physical changes would prevent them from having satisfying sex life.

Conclusions: We obtained a comprehensive understanding of the needs of our patients concerning sexuality. We hope to better target our efforts to meet their expectations / fears, minimizing restrictions on participation of a satisfying sex life.

Key words: brain injuries, traumatic; stroke; sexuality

O – 038

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DEGENERATIVE DISEASE: ROLE OF REHABILITATIVE TEAM WORK

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Introduction: Patients suffer from chronic neurological disease often received only medical treatment by neurologist and sometimes never consulted with rehabilitation medicine specialist.

Materials and methods: We present a young patient suffers from longstanding Parkinson disease and diabetes mellitus with severe Charcot foot deformities which cause functional decline. He was admitted to our rehabilitation center due to general deterioration after acute illness. He was bed ridden, unable to stand and walk, with severe resting tremor and rigidity. His foots had typical Charcot deformities. Neurologic and orthopedic rehabilitation team work reveal to dramatic improvement of general status, safety of patient gait and quality of life.

Results: We discuss about the role of rehabilitation approach to patients with chronic degenerative diseases, like Parkinson disease, multisystem atrophy, multiple sclerosis, Alzheimer disease and importance of motor and cognitive training along with strong drug administration in rehabilitation setting.

Conclusions: Accurate multidiscipline rehabilitation team treatment and follow up may cause stabile functional status of patients suffer from degenerative disease and improved their quality of life.

Key words: degenerative disease, multidiscipline rehabilitation team

**MAJOR FACTORS THAT INFLUENCE LENGTH OF STAY AND FINAL OUTCOME IN
EUROMEDICA AROGI PATIENTS TWO AND A HALF YEARS EXPERIENCE**

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Introduction: Final outcome and length of stay are important factors in economics of rehabilitation. The medical condition and severity of diagnosis of the patient on admission, age, and gender are important to predict the final outcome and the length of stay. It is important for patient and family members to have an estimate of the duration of hospitalization and condition on discharge.

Materials and methods: We collected data from patients who were admitted in Euromedica Arogi Thessaloniki rehabilitation center from 01.01.2011 to 30.6.2013. The results of our rehabilitation program were evaluated using Functional Independent Measure (FIM). The whole population of patients for this time period consisted of 3.475 patients. Two hundred fifty four patients were excluded due to incomplete data. The patients' data were extracted from Euromedica Arogi database with the Med. Info System called "IASIS. NET". Patients data included gender, age, diagnose, FIM admission and FIM discharge. These data were processed in SPSS v. 16.1. Patients were divided in 8 categories 1= Amputation, 2=SCI, 3= Rheumatic and Pain 4 = TBI, 5= CVA, 6=Peripheral neuropathy 7= Orthopedic surgery, multiple fracture patient and sports injuries patients, and 8=Parkinson patients. This study concern the orthopedic surgery, CVAs TBIs and SCI patients (3031 patients)

Results: Of 3221 patients 1284 were males, and 1937 were females. The majority were orthopaedic surgery multiple fracture and sports injuries 2150, CVAs 724 TBIs 50, and SCI 107. The mean age of orthopaedic patients is $72,27 \pm 19,08$, CVAs $71,93 \pm 13,54$ TBI $52,46 \pm 24,6$ and SCI $54,75 \pm 21,5$. . The statistical analysis of the data shows that the age, LOS, Final FIM are statistically significant

Conclusions: Rehabilitation is a complex process which is influenced by the age of patient and the diagnosis. Our results show that the length of stay and the final outcome are proportional to the initial FIM of the patient.

Key words: Length of stay, Final Outcome, FIM rehabilitation process

O – 040

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WHAT'S THE FUNCTIONAL IMPACT OF BOTULINUM TOXIN TYPE A TREATMENT FOR SPASTICITY IN A POPULATION OF STROKE - SURVIVOR INPATIENTS? – EFFECT MEASURED BY TOTAL AND MOTOR SUB-SCORES OF FIM

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Introduction and Objectives: A stroke is a landmark event, because it's largely associated with functional impairment, leading to loss of independence in activities of daily living (ADL) and loss in quality of life. Rehabilitation of these patients requires a comprehensive program, which can be supplemented by pharmacologic therapies like botulinum toxin type A (BTX-A), to improve spasticity, pain and/or joint range of motion. The Functional Independence Measure (FIM) is widely used to assess patient's functional status and the outcomes of a rehabilitation program. This instrument, applied at admission and discharge, includes two major subgroups of items, motor and cognitive, allowing a global and detailed view of functional abilities. This paper aims to analyse the impact of BTX-A in both total and motor FIM scores, by comparing the score changes achieved during the phase of inpatient rehabilitation in patients who were and weren't treated with the above mentioned substance.

Material and Methods: The authors collected data from clinical files of 159 stroke survivors, admitted to an Adults Rehabilitation Service, from January 2010 to December 2011. We analyzed and compared the changes of total and motor FIM scores achieved by 47 patients, who were treated with BTX-A with the total sample of 159 patients. Statistical analysis was performed using SPSS ®.

Results: The study included 159 patients, 42.1% were women. Average age was 59 years. Ischemic stroke was the etiology in 75.5% of cases. Paired samples t-test showed significance ($p < 0.001$) both in the change of average total FIM scores (from 63,12 to 87,65) and motor FIM sub-scores (from 42.86 to 63.10) in the study population ($n=159$). Application of Levene test showed no significant difference ($p > 0.05$) in the scores achieved by the sub-group treated with BTX-A ($n=47$).

Conclusions: These findings suggest that the comprehensive inpatient rehabilitation program produced significant gains in patients' functional status, measured by total scores and motor sub-scores of FIM. The fact that the sub-group treated with BTX-A achieved similar improvement in these scores, shows that the patient's selection criteria were adequate.

Keywords: stroke, rehabilitation, FIM, botulinum toxin type A

**THE DEFICIENCY OF AN UNIFORM MEASUREMENT SYSTEM LEADS TO PRESENTATION
OF UNEQUAL RESULTS FOR RECOVERY OF SHOULDER FUNCTIONS AFTER
OBSTETRIC BRACHIAL PLEXUS INJURY**

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Introduction: The recovery of shoulder functions after obstetric brachial plexus injury in the literature is presented in the range from 3% to 95%. One of the causes for the discrepancy in registered results is the difference in measurements in these studies.

The aim of our study is to show how different methods of measurement can reflect on the presentation of recovery level of the arm flexion after obstetric brachial plexus injury.

Materials and methods: The research included 54 children during the treatment of obstetric brachial plexus injury at the Institute of Physical Medicine and Rehabilitation "Dr. Miroslav Zotović" in Banja Luka. Recovery of arm flexion was monitored during first 6 months and evaluated in two ways: *the establishment of the movement against gravity (Gillbert Tassin scale); *the full amplitude of active movement. Control measurements were conducted every month.

Results: In the study group, there were 26 (48%) girls and 28 (52%) boys. The Erb - Duchene palsy was the most common, including 39 (72%) of examined children. The least number of examinees had Klumpke - Dejerine palsy - 2 children (4%) and 1 child (2%) had the symptoms of Klumpke - Dejerine palsy and Horner's syndrome. Right brachial plexus injury was found in 28 children (52%) and left brachial plexus injury in 26 (48%) patients. The application of Gilbert Tassin scale in the first month of life in examined children verified active movement in terms of flexion of the upper arm against gravity (M3) in 5 (9.3%) children. At the end of the six month period all 54 examinees (100%) had this mentioned movement. The full range of motion in terms of flexion of the upper arm in the first month of life was measured and verified in 3 (three) children. At the end of the six month period 35 children had the full range of motion. The recovery defined by full range of motion was 65%. In this study, the appearance of motion against gravity is intensive in the first 4 months of life and occurs equably during the first 6 months of life. After that period the changes are less significant. Recovery at six months of age varies in the range between 65% and 100%, depending on the definition of recovery and methods of measurement. The study shows the significance of the means of monitoring the recovery of arm function, the reliability of the results of recovery in the studies dealing with this problem. By definition of reliable scientists recovery is considered to be the establishment of the full range of motion in the analyzed arm segment. Most researchers reported recovery over 50%, which is consistent with the results of this study, if the recovery and the method of measurement are clearly defined for further studies. The presence of high percentage of full recovery (95%) is confusing for the medical specialists because in clinical practice the large number of children is objectively with residual sequelae and various degree of dysfunction. In these patients, there is improvement in the clinical assessment, but also certain degree of deficiency. Therefore it is necessary to generate the unique categorization of recovery and the unique parameters of measurement. The division of recovery in different categories in the literature shows variations from different authors.

Conclusions: This research demonstrates the necessity for the unique measurement and unique definition of recovery, which would be implemented in all researches dealing with this issue. Thereby the recovery results of the shoulder movement would be optimal and there would be no unacceptable differences in presentation of recovery in patients which now can be found in the literature and it wouldn't lead to confusion in patient's parents, who often have unjustified, unreasonable expectations based on too much different information.

Key words: obstetric brachial plexus injury, active movement

OUTCOMES OF PSYCHOMOTORIC FOLLOWING AMONG INFANTS WITH IDIOPATHIC HYPOTONIA

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Introduction: The term hypotonia is often used to describe children with reduced muscle tone. Principal manifestation of idiopathic hypotonia is diminished resistance to passive range of motion in joints, sparingly spontaneous motor movements and joint hyperextensiveness. Hypotonia may be caused by peripheral and central nervous system disorders and metabolic, neuromuscular and connective tissue disorders. In some cases, the underlying cause of hypotonia is unknown and is referred to as idiopathic hypotonia.

The purpose of this study was to show observed results of the psychomotor development among infants with idiopathic hypotonia.

Materials and methods: Conducting a retrospective clinical study, we followed psychomotor development of 20 children with idiopathic hypotonia without significant abnormalities of neuromuscular system, in which the differential diagnostic process has not determined a definitive cause of hypotonia. For the evaluation of the psychomotoric development we used the Munich functional developmental diagnostic, based on the description of age: crawling, sitting, walking, grasping, perception, speech development and social contacts development. The diagnosis was made by detailed patient history, Vojta's diagnostics based on postural reactions, along with clinical assessment and evaluation of resting postures in prone and supine (passive tone), muscle tone, deep tendon reflexes. To exclude neuromuscular etiology of the hypotonia patients were sent to additional diagnostic tests.

Results: Analysis of the data showed that a developing slowdown was greater in the motor than in mental part of psychomotoric spectrum: 87.5% of children established head control to 5th month of age. Crawling on average, was established in 15.5 month, sitting as an independent function in these children sets with an average of 13,3 months. Function of independent standing and walking in 39% of children were established between 14th and 17th months, 33% between 23th and 31th months of age. In terms of mental status 43.8% of children were developing mental functions in corresponding calendar age, with 37.5% in the broader framework of expectations. Lower section shows the slowdown of mental development: 6.3% had borderline or easier slowing of mental functions in relation to chronological age. 44.4% of these children are followed and after the age of 3 yrs. old because of postural insufficiency, various foot deformities (pes planovalgus, pes talovalgus, genu recurvata).

Conclusion: Children with idiopathic hypotonia normally pass the different stages of motor development but at a slower pace, intellectual development is normal.

Key words: Idiopathic hypotonia, psychomotor development, developmental disabilities

**TEN YEARS FOLLOW-UP OF THE CHILD WITH RASMUSSEN'S ENCEPHALITIS
(SY RASMUSSEN)**

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Rasmussen's encephalitis is the chronic focal encephalitis, with unknown etiology, characterized by frequent focal seizures. It generally occurs in children. In patients resistant to medication treatment, surgical treatment may make them seizure free.

The goal: To show the importance of the correct and timely diagnosis and adequately and continuously implemented physical therapy in children with this syndrome.

The method: The girl aged four years diagnosed with partial epilepsy and gait abnormality was referred to physical treatment specialist to examine her. She was delivered in term by cesarean section. Until three years of age she had normal psychomotor development. The kinesiotherapy was started and further investigation was continued. After second hospitalization and second MRI, she was diagnosed with Syndrome Rasmussen. From March 2003. till June 2013. continuous ambulatory kinesiotherapy was conducted at the Pediatric physical Treatment Ward of Health Center Kruševac, together with educating parents to do physical therapy at home.

The results: Regardless of continuous kinesiotherapy program and medication treatment in the period from 2003.-2006., motor deficit and intellectual impairment deepened (from the initial weakness of left lower extremity muscle strength to development of left sided spastic hemiparesis, walking difficulty mostly impossible without help and intellectual deterioration, IQ 63 with difficulty in communication). After first surgical intervention in 2006., the child was seizure free. Everyday medication and physical treatment was continued. A year later, in 2007. the girl started going to school (IQ 85). She had corrective orthotics for upper and lower extremity. Seizures occur again in May 2008. In 2013. the second surgical intervention was done (complete section). From June 2013. she walks without any help, she has active movements of shoulder and elbow joint on the left side and non functional hand. She has full extent of movement in all joint segmentations of left upper and lower extremity.

The conclusion: Functional capacity of a child with a syndrome depends of timely and adequately implemented physical treatment. In order to maintain achieved results, considering the nature of the disease, and with respect to growth aspect, besides medication treatment it is also necessary to continuously and adequately conduct physical treatment in children with Syndrome Rasmussen.

Key words: syndrome Rasmussen, physical treatment, seizure, surgical treatment

O – 044

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HALLIWICK CONCEPT IN THE TREATMENT OF CHILDREN WITH CEREBRAL PALSY (CP)

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Introduction: The significance of Halliwick concept in the multidisciplinary treatment of children with cerebral palsy (CP).

Methods: We monitored 11-year-old boy with CP (diskynetic type). Hydro physical therapy was applied through the Halliwick concept once a week within 18 months period. Gross motor function was measured through that period of time with GMS 66 test. The testing was done three times, in September 2011. - at the beginning of the hydro physical treatment, in September 2012. and in June 2013. The manual ability was assessed with MACS test. The ability of swallowing, verbal communication and social interaction was observed also during the period of time.

Results: GMF66 score in the period of September 2011 to September 2012 was increased from 68 to 70,99, with no changes in functional level. The rate and agility in activities of daily living was increased. The communication and participation in peer activities was improved. The speech, swallowing and control of salivation was enhanced by establishing the control of respiration.

Conclusion: The Halliwick concept has significant position in the improvement of functional skills of children with CP, increases motivation for participation and collaboration in the treatment and opens up the possibility for more significant participation in life environment.

Key words: Halliwick concept, cerebral palsy, improvement of functional skills

**THE ROLE OF PSYCHOMOTORIC STATUS ON REHABILITATION PROGRAM INCLUSION
IN CHILDREN WITH CONGENITAL HYDROCEPHALUS**

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Introduction: Congenital hydrocephalus (CH) presents abnormal accumulation of cerebrospinal fluid in endocranium due to the production, flow or absorption disturbances. Patients with CH could have various degrees of psychomotoric delays. Inclusion into rehabilitation program may prevent onset of complications that could alter normal development. Therefore, the purpose of this study was to evaluate the correlation between inclusion into early and continuous rehabilitation program due to the psychomotoric status in children that underwent surgical correction of hydrocephalus. **Material and Methods:** We have evaluated 52 children that were referred to University Children's Hospital for treatment of congenital hydrocephalus. The study included only operated patients. The further parameters were analyzed: psychomotoric status adjusted with patient's age, early rehabilitation and continuous rehabilitation. Two categories were analyzed: absence or presence in psychomotoric delay, inclusion and non-inclusion into early and continuous rehabilitation program. Also, we have evaluated the proportion of patients that were included into early rehabilitation program who continued continuous rehabilitation.

Results: There were 34 (65.4%) patients with delay in psychomotoric development (PD) and 18 (34.6%) patient with normal PD. Only 3 (8.8%) patients with delay in PD were not included into early rehabilitation program, while entire group with normal PD underwent early rehabilitation program. Early rehabilitation was significantly frequently implemented (49:3, $p < 0.05$) in children with operated CH. For the group with delay in PD, more than ¾ of patients (79.4%) were included into continuous rehabilitation, while for those with normal PD, only 1 (5.6%) patient was included into continuous rehabilitation. There is no statistical significance (28:24, $p > 0.05$) between frequencies for inclusion and non-inclusion into continuous rehabilitation program. More than half of participants (N=27; 55.1%) that were included into early rehabilitation continued continuous rehabilitation program, while less than half (N=1; 33.3%) of those without early rehabilitation demanded necessity for inclusion into continuous rehabilitation program, stressing out significant correlation between inclusion into early rehabilitation program and further necessity for continuous rehabilitation ($p < 0.05$).

Conclusion: Our results stressed out that psychomotoric status in children with CH plays significant role in rehabilitation program (early and continuous) planning. Further, we have shown that there is significant correlation between inclusion into early rehabilitation program and necessity for continuous rehabilitation.

Key words: congenital hydrocephalus, psychomotoric development, rehabilitation, children

EFFECTIVENESS OF PHYSICAL THERAPY ON PAIN AND FUNCTIONAL STATUS IN RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid arthritis is a chronic, progressive, systemic, inflammatory disease characterized by synovitis, joint pains, morning stiffness and function damage, all of which leads to general and working disability. Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage.

Aim of the study is to examine the intensity of pain and functional status in patients with RA at the beginning and after completion of physical therapy and the frequency and type of painful sensations.

Methods and materials: The study was conducted on 56 patients aged 27-71, diagnosed with rheumatoid arthritis who performed physical therapy in a special hospital for medical rehabilitation for a period of 21 days. There were 35 female patients (62%) with a mean age of 53.33 ± 2.45 years and 21 male respondents (38%) with a mean age of 59.09 ± 2.11 years. The mean age of the sample group was 55.12 ± 3.41 years. Physical therapy consisted of physical training, hydrogymnastics, electroprocedures, massage, curative mud, and occupational therapy. Drug therapy did not change. The assessment of the severity of pain as well as the assessment of types of experienced pain was conducted at the beginning and at the end of the 21-day physical therapy. Respondents rated the intensity of pain by visual pain scale (VAS), and evaluated the type of experienced pain on the modified version of the McGill questionnaire. Functional status was investigated with Health Assessment Questionnaire (HAQ). The results were analyzed by statistical methods in accordance with the SPSS PC-program.

Results: The average duration of disease was 12 ± 1.42 years. Functional ability before treatment was HAQ = 1.99 and 1.78 after treatment. There was no statistically significant difference in functional status ($p = 0.733$), although the absolute values shift towards better functionality. 96.79% of respondents claimed to have had a painful experience, and the assessment of pain averaged 6.67 ± 2.54 on VAS scale. After completion of physical therapy the assessed pain averaged 4.87 ± 68.32 . The difference in the intensity of pain experienced at first examination and after physical therapy was statistically significant ($p = 0.021$) in reducing pain. There was no statistically significant difference in the perception of pain intensity based on gender. The most common sites of pain include: joints of the hands and wrists (86%), knee (60%), the joints in the foot and toe joints (52%), shoulder (39%), cervical spine (33%), elbows (20%), hips (7%). The experienced pain was estimated as: exhausting (86%), tiring (95%), sharp (65%), annoying (83%), hard (76%).

Conclusion: In the observed group of patients there was a statistically significant difference in reduction of pain intensity after conducted physical therapy. There was no statistically significant difference in functional status before and after treatment.

Keywords: rheumatoid arthritis, pain, functional status, physical therapy

O – 047

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**BODY MASS INDEX AS A RISK FACTOR FOR THE DEVELOPEMENT OF
OSTEOPOROSIS**

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Introduction: Osteoporosis is caused by a complex interaction of genetic, hormonal, metabolic, and other factors. One of the important places in the pathogenesis of postmenopausal osteoporosis occupies level of nutrition and body mass index.

The aim of this study is to show the degree of correlation between body mass index (BMI) and bone mineral density (BMD) as a risk factor for osteoporosis in postmenopausal women where menstrual history was normal.

Materials and methods: We worked out a cross sectional study, in which involved 228 postmenopausal women, who underwent central bone mineral density (BMD DXA) on the device Osteosys, at Institute for Rehabilitation, and measured body mass index (BMI). The results were interpreted according to the current definition of osteoporosis, and the data analyzed in the statistical program SPSS 14.0 for Windows.

Results: Out of 228 postmenopausal women, 77 had normal body weight with an average body mass index (BMI) of 22.21 kg/m², average age 61, while the average T score at the spine and hip was at the level of osteopenia. Same score (at the level of osteopenia) was measured in 151 patients with an average body mass index 29.38 (obesity), average age 65. From the total sample of 228 patients, 75 had the mineral bone density at the level of osteoporosis, an average body mass index (BMI) of 25.75, which corresponds to obesity. Results of the study indicate that there was no statistically significant correlation between body mass index (BMI) and bone mineral density (BMD DXA).

Conclusions: Body mass index (BMI) shows the relationship between weight and height of the body, however, does not take into account body composition, and its use is limited. It can not illustrate the percentage of body fat compared to muscle or bone mass, which are important criteria for assessing the risk of osteoporosis, and therefore could not be classified in the group of clinically important factors for development of osteoporosis.

Key words: body mass index, bone mineral density, osteoporosis

O – 048

Abstract No.: 13725272663676

**SPECIFIC QUESTIONNAIRES IN REHABILITATION OF PATIENTS AFTER
ALOARTHROPLASTY OF BOTH KNEES**

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Introduction: Specific questionnaires are developed for specific disease or condition and are focused on health related quality of life. They are not comparable with other disorders and are more sensitive to changes. Most frequently used questionnaires for patients with degenerative hip and knee disorders and after hip and knee arthroplasty are Western Ontario and McMaster Universitas Osteoarthritis Index (WOMAC) and Oxford score for hip and knee.

Objective: To show results of specific questionnaires (Western Ontario and McMaster Universitas Osteoarthritis Index (WOMAC) and Oxford score) and their significance in rehabilitation of patients with implanted total endoprosthesis of both knees.

Methods: Prospective study included 30 patients (5M, 25Ž) with aloarthroplasty of both knees rehabilitated in Rehabilitation centre „dr Miroslav Zotović“, Banjaluka, RS, in time period 2011-2013. Main measures were: gender, age, profession, range of motion (F/E) of knees, Western Ontario and McMaster Universitas Osteoarthritis Index (WOMAC) and Oxford score. Outcomes were assessed before and after rehabilitation. For statistical analysis of data we used T-test for paired samples.

Results: We found statistically significant improvement for the scores of both specific questionnaires (Western Ontario and McMaster Universitas Osteoarthritis Index (WOMAC) and Oxford score. The questionnaires were easy to use, patients understood them with ease, and they were independent in answering questions. Use of these questionnaires is helpful for quick assessment of functional status of patients as well as for evaluation of used therapy methods.

Conclusions: Specific questionnaires are being used in everyday clinical practice to monitor disease progression and for evaluating the effects of medical interventions- physical therapy. They give us a good insight in patient's functional status and contribute in gathering information along with other diagnostic and therapeutic procedures.

Key words: Oxford, WOMAC, rehabilitation, aloarthroplasty of the knee

O – 049

Abstract No.: 13693088248230

TEAM APPROACH IN PROSTHETIC REHABILITATION AFTER LOWER LIMB AMPUTEE

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Introduction: Institute for Physical Medicine and Rehabilitation “Dr Miroslav Zotović” has over 70 years experience in prosthetic rehabilitation. Great experience and a desire for better results in prosthetic rehabilitation led to the establishment of the rehabilitation team.

Objective: To describe the team approach in prosthetic rehabilitation at the Institute “Dr Miroslav Zotović”, selection of patients for prosthetic and rehabilitation and the roles of all team members for the prosthesis (physiatrist, internist - cardiologist, psychologist, social worker, physiotherapist and occupational therapist, nurse, prosthodontist, patient).

Materials and Methods: This prospective study included 364 patients over a period of three years (2010 - 2012) undergone primary prosthetic rehabilitation of the Institute “Dr Miroslav Zotović.” All patients were analyzed according to gender, age, level of amputation, etiology, and non prosthetic prosthesis. For the evaluation of the therapy was used Stanmoore Wood-scale mobility.

Results: In period of three years (2010 - 2012) prosthesis were applied on 364 patients, on 57 patients we did not applied prosthesis. Etiologically diabetes dominated in 69% of cases in 2010. and 63% of cases in 2011. and 2012. The average age stood at 63 years in 2010. and 65 years in the 2011. and 2012.

Conclusion: Co-operation of all members of prosthetic team is essential for a favorable outcome of the therapy. Teamwork is the only and best possible cooperation and communication of doctors, therapists, prosthetists, the patient and his family.

Key words: protetic rehabilitation, ambutation team work

O – 050

Abstract No.: 13739067814387

BONE MINERAL DENSITY IN MEN WITH CRURIS FRACTURE

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Introduction: Osteoporosis is one of the most common diseases, nowadays. Osteoporosis in men, although of significantly lower frequency, in comparison to women, is not only a growing health but also a socioeconomic problem.

Objective: The objective of this written paper is to establish bone mineral density in men upto 50 years of age who had cruris fracture.

Methods 66 male patients were examined. Out of them, 46 were in the investigated group (IG), they were the patients who had cruris fracture, while 20 of them were without the fracture and they were in the control group (CG). Differences in the average of patients in both I and K group were not significant according to the age, so the groups werw comparable. Measuring of bone mineral density was performed on the DXA Hologic apparatus, on both lumbar vertebra L1-L4 and on the left hip.

Results: Average BMD value on the lumbar spine in the investigated group was $0,865 \pm 0,11 \text{ g/cm}^2$ (Z-scor $-1,9 \pm 0,88$), and on the hip $0,804 \pm 0,112 \text{ g/cm}^2$ (Z-scor $-2,0 \pm 0,83$). Average BMD value on the lumbar spine in the control group was $0,998 \pm 0,122 \text{ g/cm}^2$ (Z-scor $-1,14 \pm 0,91$) and on the hip it was $0,941 \pm 0,143 \text{ g/cm}^2$ (Z-scor $-1,39 \pm 0,83$). Statistically significant difference was not found between absolute values of BMD as on the lumbar spine ($p > 0,01$), as on the hip ($p > 0,5$), between the investigated and control group. There is no statistically significant difference between average Z-score values on the lumbar spine or on the hip in the investigated and control group.

Conclusion: It was not found that there significant influence of bone mineral densitu to the incidence of fractures.

Key words: Bone mineral density, men, cruris fracture

FACTORS INFLUENCING FUNCTIONAL CAPACITY OF AMPUTATION STUMP

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Introduction and objective: Amputation is a surgical procedure by which a part or an entire limb is removed. Infections and bleeding were the main problem in the initial stage of amputations. Development of surgery over centuries, introduction of anesthesia and implementation of anti-sepsis measures have led to a new era in surgery and amputation techniques. Therefore, a much better formation of the amputation stump is achieved. By the introduction of early rehabilitation, prevention of the occurrence of post-amputation sequelae and implementation of the most up-to-date prosthetic components, we achieve better success in prosthetic rehabilitation.

The objective of the study is to achieve maximum physical, psychosocial and professional capabilities of amputees and their reintegration into society, with an emphasis on the improvement of the quality of life.

Methodology: The degree of complexity of the planned research mandates the application of the methodology of clinical experiment, epidemiological method and numerical logic. The defined investigated sample is divided into three subgroups of patients: vascular, trauma and victims of anti-personal mines. The size of the samples enables making proper conclusions regarding each of the three mentioned groups, with the observation of 20 patients in each group. Statistical parameters used in the data analysis related to the relation of a part to the whole, the average value, variation interval, standard deviation, variation coefficient, standard error in the estimated average value, probability confidence interval of $p = 0.95$, t-test, X2 test and Fisher's test and the Mann Whitney U test.

Study results: The study was conducted in three groups of patients with different etiological cause of amputation. Patients were male. There was no statistically significant difference between the material conditions, $p > 0.05$. Apparent is significant difference in MANN WHITHNEY U TEST, which related to the duration of the surgical treatment in days, between the three groups of patients, $p < 0.001$, or the time elapsed from surgery to the beginning of rehabilitation. There is also evident statistical significance of differences with regard to the time of pre-prosthetic preparation among the three groups of patients, $p < 0.01$. Factors affecting the amputation stump and the time needed to wear temporary and definite prostheses show statistically significant difference between all three groups, as well as the duration of rehabilitation in days, $p < 0.01$.

Conclusion: 1. The success of prosthetic rehabilitation depends on the biomechanical properties of the residual functions. 2. Post-traumatic sequelae extend the rehabilitation in all three subgroups. 3. Psychosocial rehabilitation has a positive effect on the course of rehabilitation. 4. New trends of modern prosthetic components have positive influence on the success of prosthetic rehabilitation.

Key words: Amputation, amputation stump, prosthesis, rehabilitation

O – 052

Abstract No.: 13710227692591

REHABILITATION OF GAIT IN SUBACUTE POST - STROKE PATIENTS

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Introduction: Great interest of rehabilitation is to restore gait ability of stroke patients. Improvement of walking promotes participation of patients in everyday community activities and allows better quality of life. Significantly reduced walking speed represents large barrier for independent performance of persons' daily activities.

Material and methods: We have conducted a 4 - week clinical trial of 24 subacute stroke patients with 6 - month follow-up. Objective was to assess the effectiveness of conventional gait training for people with subacute stroke. All subjects received 4 weeks of conventional physical therapy based on individual needs (stretching exercise, PNF and Bobath concept, cardiovascular exercises, gait training). The outcome measures were Barthel index and gait speed. Patients were instructed to walk at their natural pace and to use the regular gait assistance. Assessments were made at the beginning, at the end of the 4-week intervention program, and 6 months after the program.

Results: Changes showed significantly better improvement in the gait speed after 4 weeks of treatment and in 6 months after the program ($p < 0.05$) compared with gait speed at the beginning of the trial. On the contrary, small differences in Barthel index scores were not significant at any point of study.

Conclusion: The results of this small clinical study indicated significant improvement in gait speed of subacute stroke patients after rehabilitation treatment which remained after 6 months. Gait speed is an important factor related to independent community walking, but ability to walk in real life is also determined by several other factors such as balance, endurance, assistive walking device etc. For clinicians is important to further explore alternative forms of testing and training stroke patients in order to improve gait ability.

Key words: rehabilitation, gait, stroke, clinical trial

NEUROPHYSIOLOGICAL ASSESSMENT IN PELVIC FLOOR DISORDERS

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Electrodiagnostic medicine is assuming now an increasing role in the diagnosis and management of pelvic floor disorders.

Electrodiagnostic tests are divided into four main parts, covering:

- Electromyography: It has been performed with two distinct aims. The first is to assess the integrity of innervations in pelvic floor muscles and the second is to examine sphincter activity during bladder filling and voiding in urodynamics.
- Sacral reflexes: which are reflex contractions of striated muscle structures in the pelvic floor which occur in response to stimulation of the perineum or genital region. They are useful in studying lower motor neuron lesions affecting pelvic floor function. Different forms of sacral reflexes have been described: pudendo anal reflex, urethral anal reflex, bladder anal reflex and Bulbo-cavernosus reflex.
- Pudendal nerve conduction studies.
- Cortical and visceral evoked potentials: Cortical and spinal responses can be obtained from pudendal nerve stimulation, or bladder stimulation.

Clinical Applications: Electrodiagnostic tests are used to investigate patients with:

- Different types of fecal and urinary Incontinence
- Congenital sphincter malformation
- Sphincter muscle dyssynergia
- Therapeutic uses: Botulinum injections in sphincter muscle dyssynergia are performed with EMG guidance.

O – 054

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NEW METHODOLOGY FOR GAIT ANALYSIS IN A PATIENT WEARING AN ANKLE - FOOT ORTHOSIS

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Introduction: To present an instrumented ankle-foot orthosis (AFO) that allows the evaluation of temporospatial and cinesiologic parameters of gait in different phases and environments, such as irregular pavements and stairs. Application of the instrumented AFO in a stroke patient with spastic hemiplegia and evaluation of different gait parameters before and after Botulinum Toxin application.

Materials and methods: Utilization of an AFO, instrumented with a resistance wire extensometer, calibrated in a laboratory. Tests were performed on a patient with left hemiplegia due to ischemic stroke. Gait parameters were evaluated during three different protocols: corridor, stair and outdoor, and at two different periods: before and after Botulinum toxin application on selected muscles of the lower limb.

Results: Data analysis showed that there was a beneficial effect of the Botulinum Toxin in our patient gait patterns with a better weight distribution during the stance phase, an increase in cadence, a drastic reduction of the co-contraction peak detected in the beginning of the swing phase and a shortening of the stance phase during climbing and descending stairs.

Conclusions: This methodology is inexpensive and was successful in evaluating different gait parameters in a patient with spastic hemiplegia using an AFO. By allowing the evaluation of gait parameters outside the gait laboratory, such as in rough terrains and stairs, it holds an unmatched versatility compared with others mentioned in the literature.

Key words: Gait analysis, Ankle foot orthoses

RELATIONSHIP BETWEEN FUNCTIONAL CAPACITY AND PLASMA B TYPE NATRIURETIC PEPTIDE LEVEL WITH CARDIAC REHABILITATION IN PATIENTS WITH HEART FAILURE

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Introduction: The Six-minute walk test (6MWT) is an effective tool for assessing the functional capacity in the patients with chronic heart failure (CHF). The plasma N-terminal B type natriuretic peptide (NT-proBNP) is mostly synthesized in the left ventricle and its levels depend upon the volume /pressure overload. BNP levels are used in diagnosis and prognosis in CHF patients.

Aim of the study was to evaluate whether the plasma levels of NT-proBNP, are linked to functional capacity, as assessed by 6MWT, after exercise training in ambulatory CHF patients.

Materials and methods: We studied 50 outpatients (age 62.9±8 yrs, 40 males and 10 females) with CHF (EF < 40% by echocardiography) secondary to ischemic heart disease. All patients were in stable clinical conditions and in optimal medical treatment. Patients underwent an exercise training program consisting in 21.6±6.9 sessions of moderate intensity, continuous aerobic exercise. 6 MWT and NT-proBNP were assessed before and after cardiac rehabilitation

Results: No changes in drug therapy occurred during the study period. After exercise training the distance walked at 6MWT increased significantly from 434.20±17.89 to 524.68±20.14 meters (p<0.001) and NT-proBNP levels decreased significantly from 444.51±159.4 to 310.14±105.44 pg/ml (p<0.001). However, there was only a weak, non significant, negative correlation (r=- 0.114) between changes in the 6MWT and changes in NT-proBNP.

Conclusion: Our data suggests that in CHF patients exercise training improves both functional capacity and central hemodynamics, as reflected by NT-proBNP. However, these effects are not related one each other. These finding would confirm that the benefits of exercise training in CHF patients rely mainly on peripheral mechanisms, although a positive cardiac remodeling may also occur.

Key words: N-terminal B type natriuretic peptide, Six-Minute Walk Test, Chronic Heart Failure

O – 056

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**USEFULNESS OF IN – HOSPITAL REMOTE TELEMETRY IN CARDIAC REHABILITATION
UNITS. OUR CENTER EXPERIENCE**

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Introduction: Cardiac remote telemetry is the transmission of cardiac signals from a patient to a distant receiving location with a goal of rhythm monitoring to ST segment monitoring and sophisticated arrhythmia detection and diagnosis under surveillance of trained personal. We aimed to investigate the usefulness of cardiac telemetry in patients' admitted after coronary artery by pass surgery (CABG) or percutaneous coronary intervention (PCI) in our in-hospital cardiac rehabilitation center.

Materials and methods: Out of 1676 patients admitted for in-hospital cardiac rehabilitation, we studied one hundred two patients with previous CABG (51%) or PCI (49%), 63% males, aged 63.78 ± 8.01 years). Risk factors were noted, blood was sampled for analyses. Exercise test were performed on admission and after 21 days of in - hospital rehabilitation. According to the first test results patients were selected for exercises program: free walking, cycle and/or Nyllin steps. During the exercise patients were continuously monitor by using wireless cardiac remote system of 3 channels. signals were transmitted to the central work station. The surveillance of the displayed signals was continuously assessed in real time by a personal trained in arrhythmia recognition supervised by a cardiologist.

Results: By using cardiac remote monitoring ST segment depression ranging from 0.5 to 1.5 mm was detected in 4% of pts, while rhythm disorders were detected in 30% of patients: paroxysmal atrial fibrillation, VES, SVES. Right bundle branch block de novo was detected in 2% of the patients and was bad prognostic parameter.

Conclusions: Cardiac remote telemetry is useful diagnostic tool in cardiac rehabilitation program, especially in patients after surgery in whom paroxysmal atrial fibrillation is common disorder.

**EFFECTS OF CARDIAC REHABILITATION IN FUNCTIONAL CAPACITY AND
CARDIOVASCULAR RISK FACTORS IN PATIENTS WITH TYPE 2 DIABETES**

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Introduction: Cardiac Rehabilitation Programs (CRP) are recognized as an integral part of a comprehensive plan of care for patients with cardiovascular disease. Individuals with Diabetes Mellitus (DM) have 2 to 4 times the risk of developing and dying from Coronary Heart Disease (CHD) when compared with non-diabetic patients. Meta-analyses have shown a profound benefit of CRP in the overall population. However there are limited data that specifically address CRP in diabetic patients, although such programs may be especially important in this group of patients. The purpose of this study was to determine whether Type 2 diabetic patients with coronary disease can obtain, after CRP, a similar benefit in functional capacity and cardiovascular risk factors to non-diabetic coronary patients.

Materials and methods: A prospective cohort study was carried including 682 patients, who completed an hospital based CRP (phase II) between January 2008 and June 2012. Two groups were considered: diabetic and non-diabetic patients. Diabetics group included those with previous DM or on anti-diabetic medication. Patients were evaluated in the first consultation and three months later and the following parameters were recorded: body mass index (BMI), waist circumference, lipid profile, glucose and glycosylated hemoglobin, blood pressure, smoking habits and weekly physical activity habits (measured by the International Physical Activity Questionnaire). Functional capacity was estimated in METs (metabolic equivalents) achieved in treadmill exercise test at the beginning of CRP and three months later.

Results: The sample included 682 patients (253 diabetics and 429 non-diabetics). Diabetic patients were significantly older ($61,6 \pm 9,1$ vs $58,6 \pm 11,0$ years; $p < 0,001$), had a worse cardiovascular risk profile (higher prevalence of excess weight ($80,6\%$ vs $60,1\%$; $p < 0,001$), dyslipidemia ($76,3\%$ vs $64,3\%$; $p = 0,005$), hypertension ($70,4\%$ vs $52,4\%$, $p < 0,001$), sedentary lifestyle ($61,3\%$ vs $49,7\%$, $p = 0,013$)) and had a lower functional capacity ($7,8 \pm 2,0$ vs $9,1 \pm 2,4$ METs; $p < 0,001$) than non-diabetic patients. At the end of the CRP, all patients achieved significant improvements in all cardiovascular risk factors ($p < 0,001$) and in functional capacity ($p < 0,001$). Improvements were similar in diabetics and non-diabetics for all parameters except: average reduction in BMI levels, was significantly higher in non-diabetics ($0,9 \pm 1,2$ vs $0,7 \pm 1,0$ Kg/m²; $p = 0,008$); average reduction in triglycerides levels, was higher in diabetics ($36,8 \pm 78,2$ vs $21,8 \pm 54,8$ mg/l; $p = 0,007$); functional capacity gains, were higher in non-diabetics ($1,5 \pm 1,2$ vs $1,3 \pm 1,2$ METs; $p = 0,042$).

Conclusions: This study emphasizes the capacity of diabetic patients to fully benefit from a CRP and demonstrates that the extent of improvement in cardiovascular risk factors but not in functional capacity is similar in diabetic and non-diabetic patients.

Key words: Cardiac rehabilitation; diabetes mellitus; cardiovascular risk factors; functional capacity

COMPLEX ANALYZIS OF NATURAL AREAL FOR REHABILITATION TREATMENT

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Introduction: Correlating medical scientific research with the challenges of specific scientific and technical developments in the XXI century is a goal for the standardization of functional medical recovery protocols for the rehabilitative medicine.

From the level of nanostructures to the level of the whole body, the correlations between the climate natural factors and the influence of climate changing are top priorities in the field. Given the general trend of aging population, increased costs for tertiary care of the elderly and the modern concept in European Union “Well health aging”, there is a need to increase the quality of primary prevention in older people. Thus, the correlation of the natural climatic factor and the influence of the climatic changes is needed to be standardized for the therapeutic protocols in rehabilitation.

Materials and methods: We analysed a natural geographical area which has beneficial influence on health status. The analysed factors are: air, water, soil and subsoil, salt mine and social status. The area chosen was Cacica saline, with the two locations: the church hall and the sport hall; it was studied beginning with 19.05.2004 and the following parameters were noted: air temperature, atmospheric pressure, surface altitude, altitude in the saline, level difference. The aerosol concentration was estimated based on the data obtained by means of the particle counter and of the conduct metric method for the two chambers of the saline.

Results: The Cacica area and village has a excellent potential for the development of medical rehabilitation and medical tourism for rehabilitation.

The salt mine, with the results for the parameters studied show that: -air temperature: 11.0 –12.0 0C; -atmospheric pressure: 100925 Pa (757 mmHg); -surface altitude: 447 m; -altitude in the saline: 416 m; -level difference: 31 m.

The Cacica saline shows quite different concentrations for the two locations (0.356 mg/m³ in the church hall and 0.234 mg/m³ in the sport hall) but the values determined by the two methods are very close. The impurification degree of the aerosol is lower (~10%) and it shows a very good stability of the submicron particles (<0.5µm).

These results allow the therapy of respiratory pathologies (allergic and chronic diseases).

Hydrotherapy is performed with saline water, increasing the degree of movement and the effectiveness of the process.

Wooded landscape of over 70%, as well as location of the village ensures activities of rehabilitation medicine.

Development of social factor is determined to be the most important for accomplishing European level for medical recovery and medical tourism.

Conclusions: Cacica represents a beneficial climatic area for functional medical rehabilitation.

This can be accomplished by speleotherapy in the salt mine, hydrotherapy and physiotherapy at the ground level in special resorts for these activities. Medical activity should be performed by high level of technology for diagnostic and treatment.

Key words: Speleotherapy, saline hydrotherapy, balneo-climatic area, Cacica

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DIAGNOSIS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN PATIENTS WITH CORONARY DISEASES WHO PARTICIPATED IN CARDIAC REHABILITATION PROGRAM

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Introduction: The prevalence of chronic obstructive pulmonary disease (COPD) in patients with coronary artery disease (CAD) is not well known, although both have similar risk factors and pathophysiological determinants.

Aim: To define the prevalence of COPD in CAD patients on cardiac rehabilitation program.

Methods: Medical records of 199 patients who participated in cardiac rehabilitation program in period January-April 2011 were retrospectively analyzed. One-hundred-fifty-five had previous myocardial infarction treated with primary percutaneous coronary intervention (MIpPCI), and 44 underwent coronary artery bypass surgery (CABG). The diagnosis of COPD was confirmed on clinical and spirometry findings in 33 patients (17%), 22 with MIpPCI, and 11 with CABG. Of them, 27 (82%) were men; mean age 63±9 years, FEV₁ 75±21%, and FEV₁/FVC 61±9%, respectively. COPD was newly diagnosed in 25 (76%) patients. Compared to those without COPD, patients with COPD were more likely to be smokers (p=0,003), but with no significant difference in age and prevalence of cardiovascular risk factors (hypertension, diabetes and dyslipidemia).

Conclusion: COPD appears to be relatively frequent in CAD patients. Pulmonary function test should be recommended to smokers with CAD, what would help in establishing of early diagnosis and treatment of COPD, and subsequent improvement in their prognosis.

Key words: COPD, coronary disease, cardiac rehabilitation program

THE INFLUENCE OF SPINAL CORD INJURY LEVEL ON PULMONARY FUNCTION

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Introduction: Injury to the spinal cord diminishes the function of respiratory muscles. We sought out to assess factors that influence pulmonary function in spinal cord injury (SCI) patients. Spinal cord injury level, smoking habits, age and body mass index were analyzed.

Materials and methods: A retrospective cohort study based upon spirometry data collected from 96 subjects followed between 1997 and 2012. Subjects were characterized by level of lesion as: high tetraplegia (C5 and above), low tetraplegia (C6-8), high paraplegia (T1-6) and low paraplegia (T8-T12). Inclusion criteria required a minimum age of 18 years, subjects without tracheostomy or requiring ventilation, an initial pulmonary function test up to two years post SCI, two or more follow - up spirometric tests per participant ranging from a span of one to six years with an average duration of 2.5 years between tests. All subjects realized the pulmonary function tests while participating in a comprehensive inpatient rehabilitation program.

Results: A total of 71 male and 25 female participants realized 208 pulmonary function tests. Mean age at initial testing was of 39,83 years (18 – 74 yrs). Fifty - eight subjects had complete motor lesions. One - way ANOVA analysis established a significant linear trend, characterized by initial forced vital capacity (FVC) and forced expiratory volume in 1 s (FEV1) inversely correlated with the level of injury (i.e., the higher the level of injury, the lower the parameter). We did not verify a significant correlation between longitudinal decline of pulmonary function and level of injury. A multivariate analysis of age, smoking habits and body mass index was realized. A significant correlation between these factors and pulmonary function was not established.

Conclusions: Initial FEV1 and FVC values were significantly related to SCI level. The level of injury may be overshadowing the effects of other factors. The lack of longitudinal decline in lung function after SCI may be due to possible benefits from rehabilitation.

Key words: Respiratory function test; longitudinal studies; spinal cord injury; body mass index

**CARDIOVASCULAR REHABILITATION OF PATIENTS AFTER PRIMARY PERCUTANEOUS
CORONARY INTERVENTION WITH STENT IMPLANTATION**

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Exercise training reduces the levels of fibrinogen and plasminogen activators and modulates platelet activation, thereby reducing the risk of restenosis and acute coronary syndromes after PCI.

Purpose of our study is to determine the effect of controlled physical treatment on the further course of the disease and complications.

Methods: this study included 140 patients after acute myocardial infarction of both sexes divided into three groups. The first group with bare metal stents implantation (57 patients; 14 men, 43 women; average age $56,60 \pm 11,55$); the second group with drug-eluting stents implantation (33 patients; 27 men, 6 women; average age $59,85 \pm 9,12$) and third group treated with standard medications therapy (50 patients; 8 men, 42 women; average age $55,40 \pm 12,87$). We have registered the next risk factors: diabetes, hypertension, lipids, obesity, smoking and heritage. All patients were treated following early rehabilitation with: diet, exercise groups I and II, walking (programmed, in the intervals) a speed of 3-4 km/h, cycle to 3x50W, Nyllin-step 5x1 and 5x2. All were followed with telemetric electrocardiogram and have had 24h holter electrocardiogram.

Results: statistically significant difference ($p < 0003$) between the groups in the occurrence of new disorders of cardiac rhythm was observed in group II. T wave changes ($p < 0001$) are the most recorded in third group as well as the largest number of positive ergometer tests load ($p < 0002$). There were no statistically significant differences between the groups in the occurrence of early complications.

Conclusion: women tends to have bad coronarografy assessment, men make better measures of cardiovascular rehabilitation and greatest number of complications in the form of arrhythmias was noted in the group with drug-eluting stents. We found that cardiac rehabilitation after coronary revascularization was associated with improvements in patient physical functioning as well as their adoption of secondary preventive measures.

Keywords: cardiovascular rehabilitation, myocardial infarction, arrhythmias, coronary revascularization

**DOES PHYSICAL THERAPY WITH PHARMACOLOGICAL TREATMENT
(CORTICOSTEROIDS ALONE OR PLUS ANTIVIRAL), REDUCE THE RISK OF LONG-TERM
FACIAL PARESIS IN BELL'S Palsy?**

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Introduction: Bell's palsy remains idiopathic, but a proportion of cases may be caused by reactivation of herpes viruses. Although corticosteroids (CCT) are widely used as first line treatment, recent evidence suggests that antiviral (AV) agent provides minimal added benefit to CCT. However there is little evidence information relating to the effectiveness of CCT (alone or plus AV treatment), combined with an early Physical Therapy (PT) program.

The aim of this study is to evaluate the benefit of a PT program combined with different pharmacology treatment, in new-onset Bell's palsy.

Materials and methods: In this retrospective study, we examined records of 20 adults, who were diagnosed Bell's Palsy from September 2011 and December 2012 and were admitted for outpatient rehabilitation program. The PT program consists of patient re-education with mirror exercises, proprioceptive neuromuscular facilitation, neuromuscular re-education, manual massage and ice stimulation in order to increase specific muscular group power. We evaluated functional motor result using House-Brackmann (HB) staging, immediately before and after the PT program. Clinical data was analyzed and the patients were divided in 2 treatment groups – CCT+PT group (corticosteroids plus physical therapy) and AV+CCT+PT group (antiviral plus corticosteroids plus physical therapy). Data analysis was performed with SPSS software. Continuous variables were expressed as mean (standard deviation – SD) and categorical as proportions. We proceed to the comparison of two treatment groups using qui-squared test. Recovery based on the gain HB score was analyzed with Mann-Whitney test and Spearman correlation test.

Results: 70% patients were female, and mean age was 39 years (sd 15years). Average time between diagnosis and starting physical therapy treatment was 24 days (sd 9days). All patients had functional recovery based on HB gain. 13 patients (65%) on the CCT+PT group had mean initial HB score 3,77, and the others 7 patients (35%) on the AV+CCT+PT group had mean initial HB score 3,43 ($p < 0,005$ test). Long term paresis were observed in 3 patients in CCT+PT group (mean final HB score 1,36) and in only one patient in AV+CCT+PT (final HB score 1,42). We did not find statistically difference in HB mean gain in both groups ($p > 0,05$). We verified positive correlation between initial and final HB score in CCT+PT group (Spearman correlation coefficient 0,63 ($p < 0,05$)).

Conclusions: Prognosis of Bell's palsy is fair with complete recovery in about 80% of the cases, 5%-15% remain with severe sequelae. In this study we also find that 4 patients (20%) had sequelae that were minimal (HB final score 1,36 in CCT+PT group, and 1,42 in AV+CCT+PT group). The present study did not show different outcome in patients with Bell's palsy treated with CCT+FT, as compared with patients given AV+CCT+FT treatment. However we find that higher initial HB score was associated with higher final HB score in CCT+FT, although the correlation coefficient was moderate (0,63).

Key words: Physical Therapy; Corticosteroids; Antiviral; House - Brackmann scale

EFFECTIVENESS OF DRY NEEDLING THERAPY IN COMPLEX REGIONAL PAIN SYNDROME: A COMPREHENSIVE RETROSPECTIVE CLINICAL AUDIT

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Introduction: Complex regional pain syndrome (CRPS) is considered to be an exaggerated protective response that is almost always triggered by tissue trauma but, once »set in«, is maintained by central mechanisms. Cardinal signs of CRPS are spontaneous burning pain, allodynia, autonomic dysfunction, and limited sensory and motor function. The patients with CRPS visiting the outpatient clinic of our Institute have been involved in a rehabilitation programme including dry needling therapy (DNT) for the last seven years, so we conducted a comprehensive clinical audit to evaluate the outcomes of our approach.

Materials and methods: We analysed a non-random purposive sample of 72 patients (36 with involved arm and 36 with involved leg) who attended our inpatient rehabilitation programme between 2006 and 2012 and met the IASP diagnostic criteria for CRPS type I or type II for research work. The explanation given to the patients was that DNT opens the »pocket« containing painful chemicals produced by nerves and immune cells in the local area, so that blood flow can wash out these chemicals and enable pain relief. This way, the patient can visualize the healing process. In addition, it was explained that improvement is expected in 90% of acute cases and that numerous case reports about successfully treated patients have been published. DNT was applied in the most painful spots as identified by the patient. Manual massage (with the treated spots covered by sticking plaster) was applied for the subsequent 20 minutes. The pressure pain threshold was measured before and after the treatment using an algometer, and the results recorded on a body chart. The procedure was performed weekly, depending on improvement. Changes in temperature, oedema, skin colour, sensation and range of motion were rated and recorded. Pain intensity (maximal, minimal, mean and current) and interference (with general activity, mood, walking ability, normal work, relations with other people, sleep and enjoyment of life) were assessed using the Brief Pain Inventory (BPI) on a 0-10 visual analogue scale. The total interference score was adjusted by skipping the walking ability item for the patients with involved arm and the general activity item for the patients with involved leg. Missing data were imputed using the last-observation-carried-forward method. Analytical data visualisations were produced and bivariate statistical analysis were performed. A multiple logistic regression model was built for predicting dichotomised overall outcome (success vs. no or imperfect success).

Results: The time between the 1st and 2nd assessment was 1-39 days (median 7, mean 10.3 days); and 4-92 days (median 15.5, mean 22.9 days) between the 2nd and the 3rd assessment. All four BPI pain intensity scores diminished statistically significantly over the observation period. The number of painful spots significantly diminished and the pain pressure threshold significantly rose. BPI pain interference score significantly diminished between the therapies. Sensation, oedema, skin colour, and range of motion also significantly improved. Concomitant chronic widespread pain, involved limb and time since CRPS onset did not prove to be associated with the overall outcome.

Conclusions: Dry needling therapy with subsequent massage and accompanying explanations induces a highly effective self-healing process in the whole neural network of the persons suffering from CRPS, resulting in markedly diminished pain, improved clinical signs and better overall function.

Key words: complex regional pain syndrome, dry needling therapy, outcomes, outpatient rehabilitation

**TREATMENT OF FROZEN SHOULDER IN PATIENTS AFTER STROKE USING
ACUPUNCTURE AND EXERCISE THERAPY: A SINGLE - BLIND RANDOMIZED CLINICAL
STUDY**

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Objective: To investigate the short - term clinical effects of acupuncture as an adjunctive treatment to exercise therapy in patients with frozen shoulder after stroke.

Design: Single-blind, randomized controlled clinical study.

Setting: The study was carried out between May 2007 and April 2008 at the Department of Neurology, Military Medical Academy and the Special Hospital for Prevention and Treatment of Cerebrovascular Diseases "Saint Sava", Belgrade, Serbia.

Patients and Intervention: One hundred subjects were divided into two therapy groups: Group A included 50 patients treated by exercise therapy (ET) alone and Group B, 50 patients treated by acupuncture and exercise therapy (AP-ET). Over a 4 week period, the ET group received 20 treatments, each lasting 30 minutes. The AP-ET group received 20 treatments consisting of 30 minutes ET and 20 minutes acupuncture.

Outcome measures: The primary outcome measure was pain intensity measured by the Visual Analogue Pain Scale. Secondary outcome measures were shoulder movements, the Modified Ashworth Scale (MAS) and Brunnstrom stages of post-stroke motor recovery. Measurements were taken before and at the end of the 4 week treatment period.

Results: Statistically significant differences were found in the AP-ET group for intensity of shoulder pain ($P = 0.00$, $\chi^2 = 70.01$, with high effect size $d = 0.84$), MAS ($P = 0.00$, $\chi^2 = 54.778$, with medium effect size $d = 0.77$), Brunnstrom stages ($P = 0.00$, $\chi^2 = 45.283$, with medium effect size $d = 0.67$), passive abduction ($P = 0.00$, with high effect size $d = 2.62$) and active abduction ($P = 0.00$, with high effect size $d = 1.63$).

Conclusion: Acupuncture combined with ET was found to have positive effects on shoulder pain and upper limb spasticity after stroke and could be useful in the treatment of frozen shoulder in stroke patients.

Key Words: stroke, rehabilitation, acupuncture, adhesive capsulitis, exercise therapy

EFFECTIVENESS OF MESOTHERAPY ON TEMPOROMANDIBULAR JOINT DISORDERS

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Introduction: Temporomandibular joint disorders (TMJD) are a very common pain disorder however, only a few patients will seek and require medical assessment. The aetiology and the best course of treatment for TMJD remain unclear. There is a general consensus that a conservative, non - invasive approach should be the first - line of treatment. The goal of this study was to evaluate the effectiveness of mesotherapy (intradermal injections at the site of pain), as a viable option for pain relief in TMJD.

Materials and methods: We conducted a case review of all TMJD patients treated since 2006 with mesotherapy procedures only. We utilized mesotherapy to introduce pharmaceutical drugs via multiple intradermal injections (6 - 8 injections). All patients were treated using a cocktail of drugs composing of lidocaine, piroxicam and pentoxifylline, 6cc in total. Ethyl chloride was used for anaesthesia. Patients were treated every 15 days until symptomatic relief is achieved and thereafter every 2 months. Main outcome was complete symptomatic relief, associated factors were analysed.

Results: 27 patients were included (24 females), aged 25 – 80 years old (mean 52,92) and no age predominance was found. Six patients had minor TMJ trauma history. Bilateral affection was present in 8 patients, 10 had only left side affection. Follow up period ranged from only one application to 84 months post initial treatment (median of 19). Complete pain relief was achieved in 26 patients (96%; CI95% 83.1-99.8), the necessary number of procedures to get pain relief ranged from 1 to 6 (median of 1). The total number of treatment sessions ranged from 1 to 40 (median of 11). 19 patients had other painful complains, mainly related with anxiety disorders. A weak correlation (Spearman's $\rho = 0.325$; $p = 0.098$) between anxiety disorders and the required months of treatments was found.

Conclusions: Despite the selection bias, lack of randomization and small sample size, mesotherapy seems to be a valuable option on pain relief in a temporomandibular pain syndrome with none of the systemic effects of oral medication. Anxiety may have a role on the aetiology and therapeutic success that highlights the holistic approach of these patients. There is a scarce amount of published literature respective to the application of mesotherapy in temporomandibular pain disorders. Further studies are necessities to validate this approach.

Key words: temporomandibular joint disorders; mesotherapy; pain

SHOCKWAVE – NON-SURGICAL TREATMENT WITH RADIAL WAVES – METHOD DISPLAY

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Introduction - Shockwave treatment with radial waves is modern noninvasive method of rehabilitation of patient with painful shoulder, tennis elbow, pain in hamstring muscles, jumper's knee, inflammation of Achilles tendon and bone thickening.

Objective - Objective of this paper is to show this method of treatment with radial shockwaves as remarkable method in treatment of painful musculoskeletal conditions.

Method - Technology of radial shockwave therapy was first time used in medical purposes 20 years ago, in of kidney stones elimination, without damage of skin or tissue. Some of the side effects that have been observed during using of this technology, such as faster bone healing and faster tissue regeneration, led to the development of shockwave apparatus and radial waves therapy, which is now widely used in physical medicine. It is unique and non-invasive solution for pain associated with musculoskeletal system, three to four treatments at weekly intervals, and the therapeutic period lasts only a few minutes. Shockwave is an acoustic wave which carries high energy to the painful fibrous tissue or musculoskeletal tissue with sub-acute, sub-chronic and chronic conditions. This energy promotes healing, regeneration and reparation process in tissue and soft tissue. Shockwave therapy apparatus and radial waves are used for conditions such as painful shoulder, tennis elbow, pain in the pelvic area and hips, jumper's knee, pain in the hamstring muscles, bone thickening, Achillodynia - a painful condition Achilles tendon. Shockwave device is used in treatment of calcification in ligaments, tendons and muscles. It is also used for stimulation of muscle trigger points, the regeneration of muscle and connective tissue, as well as acupressure therapy, with lymphatic drainage. Excellent results of shockwave radial waves treatment are shown during treatment of cellulite and body shaping. Radial shockwave offer non-invasive solution to the problems in connective tissue, tendons problems, pathologies of the soft tissue and the occurrence of calcification. The important reasons for the application of radial shockwave therapy in the rehabilitation process of patients are reduction in pain, boosting of the metabolism, tissue revascularization and normalization of muscle tone.

Results and relevant evidence - Radial shockwave therapy stimulate revascularization of the treated tissue, leading to regeneration. Shockwave therapy reduces muscle tension and prevents spasm. Hyperemia is one of the basic effects of shockwave therapy. It provides a better blood supply and better energy supply of hypertonic ligament and muscle structure. After application of shockwave treatment patient feels significant reduction of pain. Intense pulses that are transmitted in the tissue creating a strong nociceptive activation of alpha and beta fibers that affect interneurons, which then inhibit the transmission of pain signals. Besides reducing pain, using shockwave therapy reduces the risk of developing edemas.. Shockwave therapy has resulted in production of sufficient quantities of collagen, which is essential for the process of repairing damaged musculoskeletal and ligamentous structure. . Shockwave therapy accelerates the elimination of nociceptive metabolite, improves oxygenation and supplies damaged tissue source of energy. This method speeds up the metabolism and supports the removal of histamine and other LA irritative and harmful substances. Radial shockwave waves acting on the tissue at the cellular level. Free radicals that are emitted from shockwave device affect the chemical environment by stimulating cells that can emit substances that reduce pain and reduce inflammation. With the help of radial shockwave therapy waves dissolve hardened fibroblasts

and starts biochemical decalcification, which increases the mobility of the treated segment. Shockwave can provide massage effect, which successfully solves the trapezoid muscle stiffness in his back.

Conclusion: Shockwave therapy is extraordinary and non-invasive treatment method with almost no negative effects. At the same time, shockwave therapy is a method that leads to pain reduction, better mobility and functionality of the patient, and thus contributes to a better life quality.

Keywords: Shockwave therapy, radial waves, pain, calcification, spasm

O – 067

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**SHOULDER DISLOCATION WITH EXTENSIVE PERIPHERAL NERVE DAMAGE:
OVERVIEW OF REHABILITATION IN THE PERIPHERAL NERVE INJURIES**

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Introduction: The glenoumeral joint is the most frequently dislocated articulation in the body. Anterior dislocations are the most common and may be associated with some complications such as neurovascular injuries, bone fractures, tearing of the muscles, ligaments and tendons and shoulder instability.

The aim of this study is to report a case of an anterior glenoumeral joint dislocation associated with extensive peripheral nerve damage and highlight some diagnostic and therapeutic findings.

Case report: A 63 years-old male that suffered a fall from his own height on an outstretched arm and seek for medical help one day after the event, presenting at the emergency department with shoulder deformity, pain and signs of neurological lesion. It was diagnosed an acute traumatic anterior dislocation of the right shoulder and immediate closed reduction and immobilization (with velpau bandage for 2 weeks) were successfully performed although without reversal of deficits. At our evaluation, 1 month after the event he reported severe hand and forearm pain with alodynia and severe motor deficits and functional limitation. Electromyography (at 1 month) revealed: "severe injury in musculocutaneous nerve (...) moderate sensory-motor axonal lesion of radial nerve (...) slight sensory-motor lesion of median and cubital nerves (...)". He started rehabilitation program with physiotherapy and pregabalin, with progressive clinical and functional improvement.

Discussion: In the present case, the delay in seeking for medical help may have contributed to a worsening of the associated nerve injury.

Conclusion: Early recognition of a shoulder dislocation and its potential complications may have a positive impact on the clinical outcome of patients, so that careful evaluation, prompt treatment and careful follow-up are crucial.

Key-words: shoulder dislocation, nerve injury, rehabilitation

STATIONARY GERIATRIC EARLY REHABILITATION IS WELL KNOWN AND WELL ORGANIZED IN MANY COUNTRIES. BUT IS IT SUFFICIENTLY IN OUTCOME FOR PATIENTS FROM ALL ASSIGNING SPECIALIST DEPARTEMENTS? A RANDOMISED OUTCOMETRAIL OF 1.651 PATIENTS

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Introduction and aims of the study: Stationary geriatric early rehabilitation is very well implemented and sufficiently standardized in many countries. But is stationary geriatric early rehabilitation sufficiently in functional outcome for patients from all assigning specialist departments?

Purpose: Is it possible to reach for all stationary geriatric early rehabilitation patients no matter from which department they come from a sufficient therapeutic progress in functional outcome?

Methods: The retrospective study includes all the patients from 2008 to 2012 which our department of Geriatrics and Remobilization took over from the neurologic, traumatologic, orthopaedic and internal/cardiological departments. The development was measured with the FIM (functional independence measure). The take over FIM was taken inside 72 hours after arriving and the discharge FIM was taken inside the last 48 hours before leaving.

Results: The study contains 1.651 patients, 500 orthopaedic patients with an average age of 75,67 years, a residence time from 16,42 days and a FIM development from 99 to 115 points; 465 traumatological patients with an average age of 81,52 years, a residence time from 18,52 days and a FIM development from 82 to 103 points; 454 neurological patients with an average age of 76,44 years, a residence time from 20,06 days and a FIM development from 76 to 93 points as well as 232 cardiological/internal patients with an average age of 80,29 years a residence time from 17,31 days and a FIM development from 79 to 96 points. The FIM development of all patient groups is 1,21 (+/- 0,13 points) per therapeutic day. The recommended aim value of the American Rehabilitation Counselling Association (ARCA) amounts to 1 FIM point per therapeutic day.

Conclusions: It is possible to obtain a sufficient functional progress for all patients in stationary early geriatric rehabilitation independently from which specialist department they were overtaken from.

Keywords: early geriatric rehabilitation, functional outcome, FIM

CAN PREFRACTURE LIVING STATUS OF THE HIP FRACTURE IN ELDERLY PREDICT THE AMBULATION RECOVERY?

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Introduction: Hip fractures are a major source of morbidity and mortality in the elderly and continue to be a challenge to the health care system. The number of hip fractures occurring each year is increasing as the number of elderly persons in the population increases. Identifying prefracture and hospitalization factors is important, because it may lead to more efficient use of health care resources by targeting patients who would benefit most from a more intensive postoperative rehabilitation program.

Aim: The purpose of this study was to identify whether the living status before the injury associated with recovery of ambulation ability in cognitively intact, geriatric patients with hip fracture.

Material and methods: We prospectively observed 100 patients. Inclusion criteria in this study: patients ≥ 65 years old; prefracture ambulatory independent, cognitively intact and with a femoral neck or intertrochanteric hip fracture of nonpathologic origin. All patients were identified at the time of admission when we collected information on preinjury function, ambulation and housing. Follow up was 4 weeks after surgery. Assessment of cognitive status of patients was performed by SPMSQ and ambulatory independence was measured by FIMTM – motor. Patients were classified as dependent and walking independent.

Results: The average age of the participants was 75.9 ± 6.07 , 77 were women, 33 men. At hospital discharge sixtyseven patients (67%) were in the walkers group and thirtythree (33%) in no - walkers group. Sixtyfour patients preinjury lived in the family and after surgery fortyfive (73,1%) had walking independence, while fifteen (45.5%) had walking dependence. Thirtyfour patients preinjury lived alone and after 4 weeks of follow up, seventeen patients (51,5%) had walking ability while 25,4% had walking dependence. Two patients preinjury lived in institution and 1,5% achieved dependence in walking, while 3% were independent in walking. Chi-square test obtained a high statistical significance in pre-injury living status and postoperative walking ability.

Conclusion: This study focused on prefracture living status and its impact on the recovery of patient's ability to walk. Identifying those patients who would most benefit from a more intensive postoperative rehabilitation program, rehabilitation care can be directed more efficiently. This study provides information that can be used to improve patient outcomes.

Key words: living, hip fracture, prediction of recovery

O – 070

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LUMBAR FLEXION RELAXATION - PHENOMENON IN THE ELDERLY

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Introduction: Lumbar flexion relaxation-phenomenon (FRP) describes the ability to relax lumbar extensor muscles at maximum lumbar flexion position bending forward from an upright standing position with knees extended. Trunk stability in this position is dominated by passive structures. Different classifications of surface electromyography (sEMG) successfully differentiated normal from abnormal results in young individuals performing the task. Moreover FRP was recommended to measure intervention outcome in chronic low back pain patients. Normal aging is associated with stiffness of discoligamentous tissues, loss of range of motion, change of neuromuscular strategies, and trunk muscle recruitment patterns starting at around 50 years of age. FRP has not been investigated comprehensively in healthy elderly subjects.

Materials and Methods. 38 volunteers (20 females, 50-90 years old) and another 43 volunteers (19 females, 18-49 years old) performed static lumbar sEMG and range of motion assessment from upright standing to maximum forward flexion and back to upright standing.

Results. Static sEMG measurements of lumbar extensors in normal male volunteers older than 50 years of age did not show FRP. Both lumbar spine and gross ranges of motion were restricted in this group.

Conclusion. Lack of FRP in healthy elderly men might cause misleading interpretations. Thus lumbar flexion relaxation testing should not be used for differentiation between normal and abnormal conditions nor for evaluation of intervention outcome in this group.

Key words: flexion relaxation-phenomenon, range of motion, elderly

EVALUATION OF BALNEOTHERAPY PROCEDURES EFFECTIVENESS IN ELDERLY AFTER HIP FRACTURE BY FUNCTIONAL INDEPENDENCE MEASUREMENT (FIM) SCALE

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Introduction: Hip fracture presents as emerging problem particularly in elderly population. This type of fracture impact significantly individual's quality of life and affects functional ability. Balneotherapy could be useful in treatment of these patients on several levels, affecting easier performance of motion range, standing with reduced weight and strengthening muscles and as massage tool. The purpose of this study was to evaluate effectiveness of balneotherapy procedures after hip fracture on patients above 65 years of age by functional independence measurement (FIM) scale.

Material and Methods: We have evaluated 203 patients that were referred to Institute for Rehabilitation in Belgrade for rehabilitation treatment after hip fracture. Eligible participants were divided into two groups: Group 1 (N=91) included patients that were introduced with balneotherapy procedures and Group 2 (N=112) included patients that were introduced into rehabilitation program without balneotherapy. Functional status was measured by FIM at admission (Group A), at discharge (Group B), 3 month post discharge (Group C) and 6 months post discharge (Group D).

Results: There is significant increase ($p < 0.001$) in functional recovery in Group 1 (Group A- 46.07 ± 4.46 ; Group B- 67.33 ± 4.41 ; Group C- 78.08 ± 6.30 , Group D- 81.34 ± 3.37) and Group 2 (Group A- 38.48 ± 8.03 ; Group B- 56.58 ± 10.71 ; Group C- 61.54 ± 14.61 , Group D- 63.24 ± 16.20) over the course of rehabilitation treatment and after discharge, except for Group 2 where significant increase lacks ($p = 0.410$) for the period between 3 and 6 months post discharge. Better functional score measured by FIM was noticed for Group 1 versus Group 2 on same occasions when measurements were done ($p < 0.001$).

Conclusion: We have demonstrated that application of balneotherapy along with other rehabilitation procedures for older patients after hip fracture significantly impact functional recovery even in the post discharge period. Therefore, it is recommended that when there are no present contraindications for balneotherapy procedures, the ones should be included into rehabilitation program of elderly after hip fracture.

Key words: hip fractures, elderly, FIM, balneotherapy

**REHABILITATION AFTER ARTHROSCOPIC ANTERIOR SHOULDER STABILIZATION –
EARLY EXPERIENCE**

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Introduction: Arthroscopic stabilization of shoulder, being the leading method in treatment of anterior shoulder instability, was introduced in our Institution in the end of 2010. A good outcome of treatment of patients with shoulder instability depends on the good result of operative treatment as well as on timely initiated and well organized rehabilitation.

The aim of the study is to show initial results in rehabilitation of patients after arthroscopic anterior shoulder stabilization.

Patients and methods: By prospective research, we monitored 23 patients after arthroscopic stabilization of anterior shoulder instability within the period from September 2010 to December 2012. Rehabilitation of all patients started on the first postoperative day and was implemented according to valid protocol through 4 stages of total duration of 6 months. Parameters of monitoring were VAS pain scale, range of motion in shoulder joint, Rowe score, Constant Shoulder Score and Oxford Shoulder Score. The results /preoperatively and 6 months postoperative/ were analyzed using Student's t test.

Results: In 17 patients, the outcome of rehabilitation was very good (73,91%), good result was achieved in 4 patients (17,39%), while 2 patient had satisfactory result (8,7%). There were significant differences in all of the parameters of evaluation ($p < 0,05$) except in the range of motion.

Conclusion: Initial experiences encourage and show necessity of rehabilitation after arthroscopic anterior shoulder stabilization which must be initiated in time and implemented professionally by multidisciplinary team approach. There is a need of constant evaluation and as needed the modification of elements of protocol of rehabilitation by the operator and rehabilitation team.

Key words: rehabilitation, anterior shoulder instability, arthroscopic stabilization

FOLLOW-UP OF 95 PATIENTS WITH BREAST CANCER IN PRM SERVICE

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Introduction: Breast cancer is the most common oncologic disease in women in all developed countries, and in Portugal it has the highest incidence, prevalence and mortality rates. The therapeutic options available can originate complication, with severe repercussions in physical, psychological, functional and social levels. Among these we highlight decreased articular range of motion, decreased muscular strength, skin complications, changes in deep and superficial sensibility, pain sensations, lymphedema, and increased dependency in active day living tasks. The PRM Service in Instituto Português de Oncologica de Lisboa, follows a great number of this patients, attending the treatment, prevention and follow up of any complications inherent to oncologic treatment.

Materials and methods: The Study was made by pre-experimental mode, with the sample consisting in 95 patients what underwent breast cancer surgery and other oncologic therapies, and evaluated has outpatients by the first time in PRM Service between January and April 2011. All the patients were submitted, using a clinical protocol developed by PMR Service of IPO, to physiatric evaluation in the first appointment, after treatment discharge and one year after the first evaluation. The parameters evaluated in the sample were: age, type of surgery, histologic diagnosis, oncologic state, body mass index, oncologic therapies submitted. The variables in this study were: Rehabilitation program submitted, number and type of pós-surgery complications, range of motion in shoulder girdle, intensity of pain, upper limb volumetric. The authors then compared the variables in the sample between the first and others appointments. For statistics were used Spearman and Qui-Square tests for variables comparison, Kruskal-Wallis and Mann-Whitney tests for evaluation of independent variables and T Student test for paired samples.

Results: The most frequent complications in this population in the first appointment were mammary oedema (76.2%), mammary seroma (63.2%), thoracic edema (60.4%). Medium pain intensity of 2.4 (Visual analogical Scale). Between appointments there were improvements in pain symptoms, number of complications, range of motion, and upper limb volumetrics.

Conclusions: This study allowed the characterization of the principal group of outpatients evaluated in PRN Service of IPO Lisbon, allowing to analyze the complications in the first appointment and their evolution and improvement with rehabilitation program submitted.

Key words: Breast cancer, pos-surgery/treatment complications, rehabilitation, follow-up

O – 074

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ANALYSIS OF REHABILITATION OUTCOME IN WOMEN POST-MASTECTOMY IN EARLY STAGE

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Introduction: Mastectomy is a frequently performed, emotionally stressful surgical procedure with important functional and psychosocial consequences. Rehabilitation can reduce post-treatment side effects and improve activities of daily living, quality of life, functional capacity of post-mastectomy patients.

The purpose of this study is to evaluate the effects of rehabilitation treatment among shoulder disability, functional status, pain and quality of life in women undergoing radical or partial mastectomy and axillary dissection.

Materials and methods: Eleven women between 39 and 72 years old, surgically treated for breast cancer, were enrolled in the study at an average of 67 days after surgery. Detailed informations were collected through clinical evaluation and standardized rating scale of pain, function and quality of life assessment. Re-education programs included motor program, instrumental physiotherapy program and ergonomic program.

Results: Our data showed a statistically significant improvements after the rehabilitative treatment. Barthel Index scale, Functional Independence Measure and Neck pain questionnaire revealed a significant reduction in disability during daily activities. Moreover the McGill pain questionnaire indicated a reduction of pain that was the main cause of functional limitation.

Conclusions: From the results of our study, we are able to conclude that both disability and quality of life significantly improved after a comprehensive-integrated rehabilitative treatment consisting of motor program, instrumental physiotherapy program and ergonomic program.

Key words: Mastectomy; rehabilitation outcome; disability

THE VALUE OF PERIOPERATIVE RESPIRATORY REHABILITATION FOR PATIENTS UNDERGOING LUNG RESECTION FOR NON SMALL CELL LUNG CARCINOMA

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Introduction: Lung cancer is one of the most common and deadly malignancy in the world. The average lung cancer patient has a 1-year survival, and only a small fraction of patients are eligible for curative surgery. Today, there is a significant prevalence of chronic obstructive pulmonary disease (COPD) in patients diagnosed with lung cancer - approximately 73% in men, and 53% in women. Surgery in these patients can be associated with increased risk of morbidity and mortality caused by their underlying lung disease. This patient population is likely to have an increased incidence of significant postoperative pulmonary complications such as atelectasis, pneumonia and acute respiratory failure requiring intubation and mechanical ventilation. Even in those lung cancer patients who do not have underlying chronic respiratory disease, physical symptom burden, fatigue, depressive symptoms and performance status may have a profound effect on physical function and predict poorer postoperative outcomes. Today, the beneficial effects of pulmonary rehabilitation (PR) in the COPD population are well documented. PR should include exercise training, both aerobic and strength, self management education and nutritional and psycho - social support. It has been unequivocally shown that targeting secondary impairments associated with COPD, such as peripheral muscle, cardiac, nutritional and psycho - social disfunction, decreases symptoms and improves exercise capacity, functional performance and quality of life. It is likely that PR can be of value for all patients in whom respiratory symptoms are associated with diminished functional capacity or reduced health related quality of life, including those who have non - COPD chronic respiratory disease and pulmonary malignancies.

Conclusions: Although today data are limited for perioperative pulmonary rehabilitation, benefit can be inferred largely from studies done on COPD and PR because of the similarity of patient populations. Today we know that PR works to benefit patients anticipating surgery but it also represents a valuable treatment alternative to patients who are poor surgical candidates. PR seems to be a cost - effective, benign intervention with no adverse effects and should remain an essential component of patient management before lung transplantation, lung volume reduction surgery (LVRS), lung resection and potentially any other elective thoracic surgical procedure.

Key words: lung resection, perioperative rehabilitation

IMPORTANCE OF RESPIRATORY REHABILITATION IN WOMEN PATIENTS WHO UNDERWENT THORACOTOMY

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Introduction: Over the last decade there has been a significant increase in patients suffering from lung cancer who are female. Almost 60% of these patients have associated chronic obstructive pulmonary disease.

Objective: To determine the effect of respiratory rehabilitation in respiratory function and tolerance the effort in the preoperative period

Materials and Methods: We followed a group of 47 female patients with primary lung cancer who were hospitalized at the Clinic for Thoracic Surgery, Clinical Centra Srbije of Surgery. These patients were in the preoperative preparation had respiratory rehabilitation because they had obstructive airway function. Respiratory rehabilitation program lasted approximately two weeks and included a bronchodilator aerosol therapy, kinesitherapy the upper and the lower extremities. As an indication of the measure of success of pulmonary rehabilitation, we used 6MTH, in which we measured the length except odometer value and oxygen saturation and respiratory function. All these parameters were measured on admission to the hospital just before the operation, ie after two weeks.

Results: Statistically significant difference in the values we obtained vital capacity (<0.001) and forced expiratory flow in one second (0.002) when expressed as a percentage and liters. That proved to be a significant difference in the distance 6MTH (0002), as well as oxygen saturation before and after performance of the test (<0.001). We did not notice a significant difference in Tifneovog index and small airways.

Conclusion: Measures of respiratory rehabilitation obviously comes to improving lung function and increase tolerance to effort, as patients with lung cancer much easier operating and postoperative recovery.

Keywords: respiratory rehabilitation, lung cancer, thoracotomy

**UPPER EXTREMITY FUNCTION AND QUALITY OF LIFE IN BREAST CANCER RELATED
LYMPHEDEMA**

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Introduction: Upper limb lymphedema is one of the most frequent complications in breast cancer survivors. Several impairments and activity limitations frequently occur in these patients leading to participation restrictions and influencing Quality of Life. Untreated lymphedema can lead deformity, functional disability, pain and recurrent infections within an edematous limb.

Aim: The aim of this study was to estimate a health related quality of life (HRQoL) in patients with lymphedema after breast cancer treatment and to investigate the correlation between scores of HRQoL and upper limb function and between scores of HRQoL and the size of edema.

Materials and methods: The cross-sectional study included 32 breast cancer related lymphedema patients who treated at Institute of Physical Medicine and Rehabilitation “dr M. Zotovic”, Banja Luka from February to June 2013. The quality of life (HRQoL) was evaluated with the Short Form 36-Item Health Survey (SF-36). Upper limb function was assessed by the Disability of the Arm, Shoulder and Hand questionnaire (DASH). The lymphedema was determined by their arm circumference.

Results: The higher HRQoL score was registered for mental health ($45,1 \pm 13,2$) than for physical one ($41,5 \pm 8,1$), which means that physical disability had more important influence of quality of life deterioration comparing to mental health. The highest values of HRQoL were observed in domains of mental health and social function. The lowest scores of HRQoL were registered in domains of role physical and general health. The mean DASH score was $41,03 (\pm 16,91)$. Upper extremity function was statistically significantly correlated with the quality of life scores on the role physical and bodily pain domains ($p < 0,01$). There were no statistically significant associated between size of lymphedema and tested domains of quality of life questionnaire.

Conclusions: the presence of breast cancer related lymphedema certainly affects upper limb functioning and quality of life, although we didn't find correlation between size of lymphedema and quality of life. Lymphedema has to be early diagnosed and treated with an adequate rehabilitative plan to prevent activity limitations. It is also necessary develop treatments and programs that can improve of quality of life and upper extremity function in subjects, alongside a reduction in edema.

Key words: lymphedema, quality of life, upper extremity function

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REHABILITATION OF ONCOLOGICAL AMPUTEE PATIENTS

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Introduction: Amputation of lower limb affects the amputee as severe physical and psychological disability. Early rehabilitation is essential and is carried out already at departments for surgery where it focuses on correct positioning of the stump in bed or on a wheelchair as well as on correct application of compression dressing on the stump aimed at the prevention of swelling and stump formation, a prerequisite for successful prosthetic fitting at a later stage. In the University Rehabilitation Center, the amputee patient is included in the complex team rehabilitation program. The final goal of rehabilitation is to enable patients to re-integrate themselves as fully as possible into their previous social life and work.

Aim: Article presents the functional outcome of patients with amputation of lower limb because of oncological disease that were admitted for rehabilitation to the University Rehabilitation Center, Republic of Slovenia, in the period from 2007 to 2012.

Materials and methods: Patients with amputation of lower limb because of oncological disease that were admitted for rehabilitation to the University Rehabilitation Center, Republic of Slovenia, in the period from 2007 to 2012.

Results: Rehabilitation outcome of patients with lower limb amputation we test with Functional Independence Measurement (FIM), with 6 minutes walking test, and 10 meters walking time.

Conclusions: Rehabilitation outcome of patients with lower limb amputation depends on the patients' age, their physical condition, the level of amputation, their primary disease and comorbidities and, last but not least, on rehabilitation program and heightened public awareness.

Key words: amputation of lower limb, oncological disease

**THE POSSIBILITIES OF EARLY REHABILITATION TREATMENT IN PATIENTS WITH
SURGICALLY TREATED COLORECTAL CANCER**

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Introduction: Colorectal cancer is one of the most common cancer. Caught early, it is often curable. The important role in functional recovery of these patients, have enhanced recovery after surgery (ERAS) clinical care protocol and early rehabilitation. The goal of this research is the objective evaluation of the effects of early rehabilitation in patients after surgical treatment of colorectal cancer, respecting their functional recovery and quality of life, before and after rehabilitation

Materials and methods: This study was made as experimental, randomized, controlled clinical trial, opened type. The examination included 73 patients (48 males and 25 females), age from 32 to 85 years, average 60,1, with surgically treated colorectal cancer. All patients had appropriate early multimodal accelerated rehabilitation program. The mean value of this program was 7,65 days. As observing parameter was used short form, 36 items health related questionnaire (SF-36), with two summary measures - Physical component summary (PCS) and Mental component summary (MCS), for the evaluation of quality of life, before and after treatment. For the statistical analysis of the aquired data, before and after therapy, was used Student's t-test.

Results: After therapy, the quality of life of patients was significantly improved, physical health ($p < 0.01$), as well as mental health ($p < 0,01$). SF36 score after rehabilitation, show important improvement of quality of life in early treated patients

Conclusions: According to the results of this study, it can be concluded that early rehabilitation accelerated program, is very efficient in treatment of patients with surgically treated colorectal cancer.

Key words: colorectal cancer; early rehabilitation; life quality

EFFECTIVENESS OF LASER THERAPY ON PAIN AND FUNCTIONAL REHABILITATION OF KNEE OSTEATHROSIS

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Objective: Osteoarthritis (OA) is a multifactoral chronic degenerative joint disorder characterized by cartilage loss, remodeling of subchondral bone and osteophyte formation. Minimizing functional limitation and pain control are two main conditions for optimal treatment of OA. Knee is commonly affected in OA. Drugs, physiotherapy modalities, exercises osteoarthritis. Among physiotherapy modalities, low level laser therapy (LLLT) is frequently used.

Aim: Our study was carried out in order to assess the effectiveness of LLLT in the treatment of knee OA by comparing two different laser therapy regimes.

Method: This study is based on the treatment of patients with gonarthrosis in the Hospital Center “Mother Teresa”, Tirana. This study is a prospective, randomized clinical, comparative. The study was conducted in the period of 3 months (January 2013 - March 2013) and is based on a questionnaire (WOMAC and Lequesne index). 30 patients were obtained in the study. Age 62.5 years old (from 45 years old - 80 years old). A total of 30 patients with a diagnosis of knee OA according to American College of Rheumatology (ACR) criteria were included in the study. The patients were randomly assigned to 3 treatment groups. Group I: actual LLLT applied 60 seconds for each 4 painful areas on the knee surface, 1.8 J/cm² dose + exercise, 10 patients; Group II: actual LPLT applied 120 seconds, 3.6 J/cm² dose + exercise, 10 patients, Group III: placebo laser group + exercise, 10 patients. All patients received a total of 10 treatments, and exercise therapy program was continued during the study (3 months). All patients were evaluated with respect to pain (VAS), degree of active and passive knee flexion/extension, duration of morning stiffness, the need for analgesic (paracetamol) intake, the patient's and doctor's global assessment of therapy regime, painless walking distance and 15 m walking time, Western Ontario and Mc Master Universities Osteoarthritis Index (WOMAC), Lequesne index at the beginning at, the 2nd and 12th weeks. Subjective, physician, and data analysts were unaware of the code for active or placebo laser until the data analysis was complete.

Results: Statistically significant improvements were indicated in many parameters such as pain (evaluated with VAS) and function (evaluated with WOMAC and Lequesne) in the post-therapy period compared to pre-therapy in both active laser groups. In addition we observed that painless walking distance and duration of morning stiffness were also improved. The improvements were more significant in group 2 in which the dosage of laser therapy was twice the other active laser group. Improvements in painless walking distance, 15 m walking time and morning stiffness were also observed in both of the active laser groups as well. On the other hand there were no statistically significant difference between the active and placebo laser groups in the degree of active and passive knee flexion/extension.

Conclusion: In conclusion, the results of this study indicate that treatment with low-intensity laser therapy at two different dosages produces a significant reduction in pain and improvement in function in patients with knee osteoarthritis (AO). Though we found significant differences between the two active laser groups this might indicate that high dosages of LPLT may play a role in reducing pain and functional disability in knee OA.

Key word: knee osteoarthritis; degenerative joint; laser therapy; pain; function

THE CLINICAL EFFECTS OF ACUPUNCTURE AND KINESIOTAPING THERAPY IN THE TREATMENT OF ACUTE LOW BACK PAIN AFTER ACUTE ISHAEMIC STROKE

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Introduction: Back pain is a frequent consequence affecting over 50% of patients after the stroke. The basic causes of back pain after the stroke are changes in muscle strength, tonus and activation, changes in sensibility, atypical movement and lessening movements. Reduction of pain, improvement of muscle strength and enzyme activity, improvement of static and stability during verticalization and walk, accelerates early rehabilitation treatment and returns of patients to everyday activities of life and work.

Aim: To compare clinical effects of acupuncture therapy and combined acupuncture and kinesiотaping therapy in patients with acute low back pain after acute ischemic stroke.

Materials and Methods: Prospective, randomized clinical study included 30 patients divided in two groups. Group A: 15 patients (8 woman and 7 man) of an average age 56 years were treated by needle acupuncture at acupuncture points - UB23, UB25, UB54, UB40, GB34, GB39, St36, and had kinesiотaping applied on m. rectus abdominis, m. quadratum lumborum and lumbar paravertebral muscles. Group B: 15 patients (10 woman and 5 men) of an average age of 59 years were treated by needle acupuncture at the same acupuncture points. All patients had Barthel index above 70 and were able to walk. Both groups had individual training of protecting movements and kinesytherapy program for the acute phase of low back pain adjusted to functional report. Pain was measured by Visual analogue scale, lumbar mobility by Shober measurement and functional disability was assessed by The Functional Independence Measure (FIM) and Oswestry Low Back Disability Questionnaire. Subjects were evaluated on 1st and 14th day of treatment. Data were analyzed by standard statistical methods. Level of signifance were 0,05 in all methods.

Results: Statistical analysis revealed no statistically significant differences between the groups in the intensity of pain, lumbar mobility and functional disability on entry to the trial. Analysis of differences within each group after 14 days of therapy revealed significant decrease in pain intensity, increase in lumbar mobility and reduction in functional disability. When differences between the groups were analyzed after 14 days of therapy, a statistically significant difference was seen, reflecting greater reductions in pain intensity and functional disability and increase in lumbar mobility in the group A when compared with group B.

Conclusion: Acupuncture and kinesiотaping are both effective addition to standard procedures in therapy of acute back pain affecting patients after the stroke. Combination of aplication of acupuncture and kinesiотaping has better effectiveness in early rehabilitation of the patients with acute low back pain after acute ishemic stroke than monotherapy. It leads to significantly faster pain elimination and better results of early rehabilitation of these patients.

NON - TRAUMATIC VASCULAR SPINAL CORD INJURIES

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Introduction: Non - traumatic vascular injuries, either ischemic or hemorrhagic, are an uncommon cause of spinal cord injury (SCI). Our aim was to describe aetiology, socio-demographic, clinical and functional characteristics of patients admitted for a rehabilitation program in a specialized SCI department with acute non - traumatic SCI of vascular aetiology.

Materials and methods: We performed a retrospective analysis of medical records of patients discharged between 01/01/2010 and 31/06/2013 with the diagnosis of non-traumatic SCI of vascular aetiology. Epidemiological and injury aetiology variables were collected, as well neurological and functional outcome measures, including Functional Independence Measure (FIM) and Spinal Cord Independence Measure III (SCIM). We have compared the results with data from patients admitted in our department with SCI from other causes.

Results: A total of 15 patients met the inclusion criteria, ten patients had ischemic and five had hemorrhagic myelopathy. All of them had an acute onset of neurologic symptoms and the event was on average 21 weeks before admission. There was a slight male predominance (53.3%) and the average age was 54 years. Quadriplegia occurred in 20% and complete injury in 26.7% of cases.

Among the patients with spinal infarction, one had the onset of symptoms immediately after an aortic surgery, one patient after an acute myocardial infarction and two patients had spinal dural arteriovenous fistulae associated. No underlying causes were found in the other six patients.

Among the patients with hemorrhagic injury, two had intramedullary spinal cord hematomas associated with Von Willebrand disease and cavernous angioma respectively, two patients had spontaneous spinal subdural hematoma which was associated with haemophilia B in one case, and one patient had a spontaneous spinal epidural hematoma.

The length of stay was on average 17 weeks. The average FIM score at admission was 95.2 and by the time of discharge there was a gain of 14.9. The mean SCIM score was 57.6 at admission and at discharge there was a gain of 18.4.

Comparing the results with the data from other patients, we have found similar average age, but smaller male predominance. The occurrence of quadriplegia and complete injuries was smaller in the vascular group, and so was the length of stay. The admission FIM score and gain at discharge was higher for the vascular SCI group.

Conclusions: Those results are consistent with literature, suggesting a predominant incomplete neurological injury, a smaller occurrence of quadriplegia and a favourable outcome with the rehabilitation program.

Key words: Non-traumatic spinal cord injuries, vascular spinal cord injuries, rehabilitation

NEUROGENIC THORACIC OUTLET SYNDROME

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Introduction: Thoracic Outlet Syndrome (TOS) is characterized by a variety of upper extremity symptoms and signs resulting from neurovascular compression (neurogenic, venous and/or arterial TOS) at the thoracic outlet area. Clinical diagnosis is often difficult, especially in the neurological form (nTOS).

The aim of this study is to present a case report of TOS and highlight some diagnostic and therapeutic particularities.

Materials and methods: Patients with nTOS usually complaints of positional, painful paraesthesia arising in the shoulder and radiating over the superior limb; some report strictly unilateral occipito-frontal headache with facial or jaw pain. Characteristically, it affects young patients, with an average age of 36 and a male preponderance. Patients with nTOS may have normal anatomy (symptoms may be due to traction of the lowest trunk of the brachial plexus caused by scalene hypertrophy) or have cervical rib or congenital or traumatic abnormalities of scalene muscles or cervical - thoracic bones. Most cases have a good response to conservative treatment but, in some cases, surgical treatment may be indicated.

Results: We present a case report of 17 years-old girl, swimmer, with unilateral headache and shoulder pain (for several months), allodynia and hand cramps, associated with progressive functional limitation, turning it impossible to perform sports activity. At the physical examination, there was an evident postural malalignment of the rachis and scapula, shoulder painful abduction and flexion over 45 degrees of motion, positive Wrioth and Adson manoeuvres, positive Ross test. Shoulder MRI, electromyography, cervical spine, chest x-rays have not revealed any significant alteration. Therapeutic strategy consisted of postural advice, pregabalin and physiotherapy for 3 months, which resulted in pain relief, improvement of functional status and health related quality of life.

Conclusions: nTOS is a rare cause of shoulder pain and its response to treatment highly depends on its causative mechanism. Management of TOS in younger patients presents many issues; careful diagnosis and appropriate treatment are crucial.

Key words: Thoracic Outlet Syndrome (TOS), neurogenic TOS, rehabilitation, treatment

**EFFECTS OF MECHANICAL LUMBAR SPINE TRACTION IN TREATMENT OF
NONSPECIFIC ACUTE AND SUBACUTE LOW BACK PAIN**

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Introduction: There are different recommendations for the treatment of patients with nonspecific acute and subacute low back pain (LBP). One of the recommendations is the use of mechanical spine traction. The aim of this study was testing the therapeutic efficacy of mechanical spine traction as an additional form of therapy for patients with nonspecific acute and subacute LBP.

Materials and methods: The study included 76 patients (37 men and 39 women) average age $47,57 \pm 9,42$ years, with nonspecific acute and subacute LBP. The average duration of pain was $4,3 \pm 2,1$ weeks. The examined patients were divided into two groups. First group (n=37) of patients („standard group“) received standard physical therapy (kinesiotherapy, low level magnetotherapy, ultrasound therapy and laser therapy). Second group (n=39) received mentioned standard treatment plus mechanical lumbar spine traction („traction group“). The average age and duration of pain between the groups were not significantly different. Static traction was applied for 12 minutes total (10 minutes at the desired intensity, plus 1 minute to increase and 1 minute to decrease the intensity). The intensity of the pull was 40-60% of the subject's body weight, adjusted on the subject's tolerance and symptom response. All patients received 12 physical therapy sessions over 6 weeks. The pain and its features, as well as degree of disability and the effectiveness of therapeutic procedures, were estimated by visual analog scale, Oswestry Low Back Pain Disability Questionnaire, Thomayer and Schober test, Fear avoidance beliefs questionnaire (FABQ) and Tampa scale of kinesiophobia (TSK). The assessments were made before treatment, at the end of treatment (6th week) and after 3 months.

Results: After 6 weeks of treatment all of the above mentioned tests showed a significant improvement. „Traction group“ had all the results significantly better than the „standard group“. After 3 months the overall results in both groups were significantly better than results before treatment, but the difference between the groups disappeared, because the results were practically equal, except FABQ and TSK results, which in „traction group“ were better than in the „standard group“.

Conclusions: Mechanical spinal traction, added to standard therapeutic procedures, may contribute to a faster recovery of the patients during the treatment of nonspecific acute and subacute low back pain, including longer and better effects on psychosocial risk factors.

Key words: Nonspecific acute and subacute low back pain, treatment, mechanical lumbar traction

RISK FACTORS FOR CEREBRAL PALSY

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Aim: to examine prenatal, perinatal and neonatal risk factors for cerebral palsy in term and pre-term children.

Design: retrospective comparative study

Material/ methods: medical documentation of 65 CP children, born in 2009. and 2010., hospitalized during 2012. in the SHCPDN was evaluated and compared with the documentation of 178 healthy children, born in the same years, referred with anamnestic indications or symptomatic risk development. 26 prenatal, perinatal and neonatal factors were considered.

Results: risk factors were expressed through OR (odds ratio) and 95% CI. Logistic regression analysis identified the following risk factors for the development of CP (Wald coefficient and significance) for all children. Among prenatal factors - mother's infection, OR 0,34, Wald 11,40 $p=0,000$ (factor significant in term children); bleeding during pregnancy, OR 0,45, Wald 5,42 $p=0,020$ (significant in term children). Among perinatal factors - term of delivery, OR 8,18 Wald 24, 29 $p=0,000$; complications with the umbilical cord, OR 6,62, Wald 10,79 $p=0,000$ (significant in term children); PROM OR 3,48, Wald 4,48 $p=0,034$ (significant in term children); methods of childbirth, OR 3,60, Wald 3,67 $p=0,048$ (significant in term children). Among neonatal factors - neonatal convulsiones OR 0,07, Wald 13,22, $p=0,000$ (significant for term and pre-term children); Apgar scor OR 0,187, Wald 11, 04 $p=0,001$ (significant in term children); RDS-OR 0,33, Wald 3,36 $p=0,049$ (significant in pre-term children).

With the Hi square test the following factors show statistical significance according to diagnosis: mother's infection $p=0,029$ RR is 2,5 for CP; bleeding of the mother and medications for pregnancy maintenance. Among perinatal factors - method of childbirth, abnormal presentation, complications with umbilical cord, PROM, narcosis, term of delivery $p=0,000$, RR is 4 for CP. Among neonatal factors - birth weight $<2500\text{gr}$, $p=0,000$ RR is 5 for CP, perinatal asphyxia, RDS, HIC-II,III, IV degree, neonatal convulsiones $p=0,000$, RR is 15 for CP; Apgar scor $p=0,000$, RR is 10 for CP; septicemia. Average number of risk factors per child in the pre-term healthy group is 9,40 and in the CP pre-term group is 10,49 $p=0,190$. Average number of risk factors per child in term healthy group is 3,16 and in CP group is 6,71 $p=0,000$.

Conclusion: numerous factors have been established as risk factors for CP, etiology in some cases remains unclear, further research involving genetic tests are required, as well as constant prevention.

Key words: risk factors, cerebral palsy

ROLE OF PHYSICAL THERAPY AND BOTULINUM TOXIN APPLICATION IN TREATMENT OF DYNAMIC FOOT EQUINUS IN PEDIATRIC POPULATION WITH CEREBRAL PALSY

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Introduction: Spasticity presents the most frequent form of all neurological manifestations in children with cerebral palsy (CP). This leads to the onset of contractures and deformities with permanent functional limitations. For reduction of muscles spasticity, intramuscular botulinum toxin type A (BTA) could be used. Therefore, the purpose of this study was to evaluate effects of BTA on spasticity reduction of feet plantar flexors as well as functional and motoric status in pediatric population.

Material and methods: We have evaluated 24 children age between 2-6 years of life with unilateral and bilateral form of CP. The BTA was administered into the spastic gastrocnemius muscle. Effects of BTA application and physical therapy were estimated by follow-up and further parameters were analyzed: active and passive movements in ankle joint, gastrocnemius muscle spasticity, and functional and motoric status. The spasticity was evaluated by modified Ashworth Scale (MAS). The evaluation and measurements were done 5 times: before treatment, 3, 8, 16 weeks post BTA application respectively and 6 months after BTA injection.

Results: There is significant difference in mean values of active feet dorsiflexion in ankle joint after BTA application ($p < 0.001$) over entire time of follow-up. The lower spasticity levels in gastrocnemius muscle measured by MAS were significantly more frequent after 3, 8 and 16 weeks post BTA application ($p < 0.001$). There is statistically significant improvement in motoric functions after 3 weeks ($p < 0.001$) post BTA application and significant improvement in functional levels after 16 weeks post BTA application ($p < 0.001$).

Conclusions: The BTA application reduces spasticity in gastrocnemius muscle, leading to the correction in dynamic equinus of affected foot and improvement in motoric and functional levels in children with CP.

Key words: cerebral palsy, botulinum toxin type A, spasticity, foot equines

GROSS MOTOR FUNCTION AND MANUAL ABILITIES IN CHILDREN WITH CEREBRAL PALSY

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Introduction: Cerebral palsy (CP) is the most common cause of motor disability in children. It affects 1.5 to 3 children per 1000 live births. The most important clinical feature of cerebral palsy is the impairment of motor skills, which refers to the degree of restriction of motor function in all body regions including the function of speech. The ability to walk is often used as a rough measure for the severity of motor impairment.

The objective of this study was to determine the functional ability of children with cerebral palsy.

Materials and methods: The study included 206 children with cerebral palsy. They were classified according to the Gross motor function classification system (GMFCS) in V levels. Level I refers to best functional ability and level V the most limited motor function. There are four age groups described within each of the five levels of GMFCS (under 2 years, 2 to 4 years, 4 to 6 years and 6 to 12 years). Four to eighteen years old children with CP were also classified according to the Manual ability classification system (MACS) in V levels. Level I relates to the best ability to handle objects in daily life, while in level V there is no ability to handle objects.

Results: Spastic form of CP was present in 86% of cases and diplegia was the most common form of CP. Functional abilities were most limited in quadriplegic and dyskinetic type of CP. Two-thirds of children with CP were able to walk independently or with an aid (level I-III), while third of children had no ability to walk (level IV and V). Limitation of medium level (level III) were present in every sixth child. Half the children were classified according to the MACS classification as level I or II, a fifth of children as level III and less than a third of children were classified as level IV or V.

Conclusions: The GMFCS and MACS classification systems enable to settle rehabilitation goals for each level of motor function according to different age groups.

Key words: cerebral palsy, child, motor disability

**VISUAL EVOKED POTENTIALS IN PREMATURES AND FULL TERM CHILDREN –
COMPARATIVE STUDY**

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Intorduction: Visual Evoked Potential (VEP) measures the visual conduction of the visual pathway from the optic nerve, optic chiasma optic radiations to the occipital cortex. It is used to assess the integrity and relative state of maturation of the visual pathways in infants and children. The VEP is useful in detecting visual conduction disturbance and maturation of CNS, it is not specific with regard to etiology. The aim of our study was to evaluate changes on VEP evaluation in praemature infants compared with age-matched normative data.

Material and Methods: We evaluated 50 praemature infants at University children's hospital when they were sixmonths old (16 were born at 28 week of gestation- First group, 34 were born at 30-33 week of gestation- Second group). Every patient was clinically assessed initially and check-up was done after 6 months. The control VEP parameters were drawn from vlaues for age-matched normative data. The diagnostic method that was implemented was VEP flesh monocular stimulation with detection of cortical responses according to international 10/20 system. Parametres that were followed-up were: presence and shape of cortical responses, latencies and amplitude. The VEP findings were classified into three categories: normal (formed responses, amplitudes and latencies were in physiological limits), mildly abnormal (poorly formed responses, limiting value latency, slightly prolonged latencies) or severely abnormal (prolonged latencies with decreased amplitudes and poor formed responses and absence of cortical responses).

Results: From First group of prematures predominantly severe degree of dysphunction was noticed (8 patients – 50%), while moderate dysphunction was predominant in second group of patients (21 patients – 61.8%). The least frequent from first group was mild dysphunction (2 patients – 12.5%), while for second group severe type of dysphunction (5 patients – 14.7%). Severe degree of dysphunctions on VEP evaluation indicates poor prognosis.

Conclusion: Premature children present more frequently with severe degree of dysphunctions on VEP evlaution. Visual evoked potentials (VEPs) have changed in praemature infants may provide information for long-term prognosis. Praemature infants with mildly abnormal VEPs do not necessarily have a poor prognosis, but should be followed-up as maturational changes or improvements in function of the sensory pathway will be reflected in the evoked potentials. Normal VEPs should be normal outcome.

Key words: prematures, visual evoked potentials, follow-up

REHABILITATION MEDICINE IN PHARAONIC ERA

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The ancient Egyptian called medicine the Necessary Art and they showed a great interest in that art. From the time of the first Dynasty onwards, there existed establishments known as PIR-ANKH OR House of life which correspond to our academies today.

The Edwin Smith papyrus, is attributed to Imhotop 3000 B.C, which is also considered the world's oldest medical document. It includes descriptions, examination procedures, diagnoses & practical treatments for forty-eight injuries, beginning at the top of the head and ending at the shoulder blades and chest. It also includes several important cases alluding to neuroscience that discuss the brain, meninges, the anterior fontanel, spinal cord and cerebrospinal fluid for the first time in the history of mankind.

The Edwin Smith papyrus gives valuable insight into the role of the spinal cord in transmission of information from the brain to the lower part of the body. They were pioneers in the rehabilitation of different diseases of the locomotory system including sports injuries.

The SOURCES of our information are:

1. The Egyptian medical PAPYRI which are the oldest medical books in history
2. Cairo museum collection of statues and mummies & old illustrations shows different types of deformities
3. X-ray of EGYPTIAN mummies shows some diseases of spine and joints.
4. Herodotus book
5. Manchester mummy 1770 which shows wood and leather prosthetic toe which was used by an amputee to facilitate walking

O – 092

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CORRELATION BETWEEN DIABETES MELLITUS AND PARAMETERS OF FUNCTIONAL RECOVERY IN HEMIPLEGIC PATIENTS

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Introduction: Hemiplegia with its occurrence, poor recovery, disability and mortality presents an important medical, social and economic problem of modern civilisation. Diabetes mellitus is a significant risk factor and contributes to poor recovery of hemiplegic patients.

Aim: to establish correlation between prognosis and parameters of recovery in hemiplegic patients with diabetes mellitus.

Materials and methods: A retrospective study was performed at the Institute for Rehabilitation - Belgrade, Selters, Mladenovac. A hundred hemiplegic patients were rehabilitated by using electrotherapy, kinesis treatment and work therapy. The parameters of research were: The Scale of Spontaneous Recovery Prognosis done before RT. Brunstorm scale, FIM scale, MMSE and DMAS scales were used upon admission, after 30, 60 days and after 6 months.

Results: Diabetes mellitus was diagnosed in 42 patients. The Scale of Spontaneous Recovery Prognosis was worse in patients with diabetes 21,524, patients without diabetes 21,362. FIM score and MMSE score were significantly lower in diabetics upon admission, FIM 37,214, MMSE 20,595.

After 30, 60 days and after 6 months they remained significantly lower / FIM score 49,524, 61,643, 66,452. MMSE 22,214, 24,167, 24,452.

Conclusions: Patients with diabetes mellitus have prognoses of worse recovery. It is proved by FIM and MMSE scores on admission and after rehabilitation was finished.

Key words: stroke, rehabilitation, research, diabetes mellitus

THE SHORT-TERM EFFECTS OF ACUPUNCTURE IN THE TREATMENT OF TRIGEMINAL NEURALGIA

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Introduction: Trigeminal neuralgia is the most common craniofacial pain syndrome of neuropathic origin. It may be primary (idiopathic) and secondary (symptomatic). Secondary (symptomatic) neuralgia is the most commonly of otogenic or dental origin, a result of temporomandibular joint dysfunction, viral infections (herpes zoster), endogenous or exogenous intoxication, tumors in the cerebellopontine angle, compression or inflammation around the nerve root or Gasserian ganglion. The cause of idiopathic trigeminal neuralgia is probably compression or vascular changes in the area of Gasserian ganglion, in tr. descendens or the nerve. It is more common in women, after the age of 50, usually in the innervation's area of n. maxillaris, second branches of the n. trigeminus. Pain that occurs during trigeminal neuralgia patients describe as stabbing or electric shock like. It is accompanied by painful tic and is measured in seconds. Periods of pain can last for months to a year and then are followed by periods of remission of the same length. Stimulations that can provoke attacks of neuralgia are chewing, brushing teeth, washing face, makeup and shaving. The current available therapeutic options for management of trigeminal neuralgia include pharmacotherapy and destructive surgical and no surgical methods. Pharmacotherapy of carbamazepine remains the first-line treatment. The aim of this paper is to examine the effects of acupuncture in the treatment of trigeminal neuralgia in patients who reported pain despite medical therapy.

Materials and methods: The clinical prospective study included 7 patients who reported pain despite treatment with carbamazepine. Total of 29 treatments during 4 years was applied in these 7 patients. Local and distant points are stimulated by acupuncture: BL2, GB14, extra3, ST2, ST3, SI18, ST6, LI4. Acupuncture treatment lasted 10 days. The pain is monitored by a visual analogue scale (0–10) on the first, the third and the tenth day of therapy. Data analysis: descriptive statistics and repeated measures ANOVA.

Results: Four women and 3 men were treated. The average age of the patients was 67 ± 8 , the average duration of symptoms 3 ± 2 years. Repeated measures ANOVA were used to compare the intensities of pain at the beginning, on the third day and at the end of acupuncture treatment. Mean and SD of pain at the start of treatment was: 9.31 ± 0.71 , on the third day of treatment: 3.97 ± 0.78 and at the end of treatment 0.55 ± 0.57 . It was found out that acupuncture significantly influenced the intensity of pain during the treatment time, Wilks' $\lambda = 0.005$, $F(2,27) = 2659.14$, $p < 0.0005$, $\eta^2 = 0.75$.

Conclusions: In our group of patients with trigeminal neuralgia, the pain was significantly reduced during treatment with acupuncture. The acupuncture has proven to be a successful additional method of treatment of pain in the patients with trigeminal neuralgia who reported pain despite medical therapy.

Key words: trigeminal neuralgia, acupuncture, pain, treatment

PHYSICAL MEDICINE AND REHABILITATION MODEL AT PSYCHIATRIC CLINIC

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Introduction: The recent finding confirms consistency of data that exercise reduces mental strain and depression and the as a important part of rehabilitation reduces fatigue, depression, increases cardiorespiratory fitness and physical functioning, improves quality of life of patients with different chronic disease. Traditional treatments for mental disorders have primarily included psychotherapy and pharmacotherapy which is not effective and may have side effects. Novel data including increased central norepinephrine neurotransmission, serotonin synthesis and metabolism and b-endorphins intermediate with possible mechanism of the clinical effectiveness of exercise treatment of depression and anxiety disorders. The current data indicate that expression of 5-HT₂CR mRNA in discrete brain sites is sensitive to physical activity, which reduces anxiety and depression produced with mechanism of 5-HT₂CR activation. Abnormal brain-derived neurotrophic factor (BDNF) signaling seems to have a central role in the course and development of various neurological and psychiatric disorders. Brain-derived neurotrophic factor and glial cell line-derived neurotrophic factor (GDNF) have a central role for the positive effects of exercise on synaptic and cognitive plasticity. **Purpose:** To suggest possible physical medicine and rehabilitation model in traditional psychiatry rehabilitation concept

Materials and methods: Data analyse of the research studies and reviews of the literature available on the NLM PubMed, Medline, Current Contents databases and the first results of sistematically performed physical rehabilitation tretament (PRT) of inpatient patients in Psychiatry Clinic of Clinical Center of Serbia.

Results: After analysing all data we may sugest three possible theraputic target group for PRT: First conceptual group of patients with neurodegenerative, musculoskeletal, oncology or other chronic disease combine with mental disorder. This is closest to traditional role of rehabilitation, which aim is whole functional restoration. Second target group consists of psychiatric patients with no additional serious disorders. Third group is where physical rehabilitation especially exercise may intervent as preventive tool, especially in person with genetic risk of development mental disease. In a period of six months of evaluation physical medicine rehabilitation model in Psychiatry clinic, all 46 patients who performed rehabilitation treatment were regruted from group one- neu rodegenerative, musculoskeletal and oncology disease. Formal comunication between physical medicine rehabilitation team and psychiatry team is at the higher level. First results are promising. Rehabilitation program included various sorts of therapy: kinesiotherapy, balance, postural and gait rehabilitation, physical agents combined with psychiatric treatment and performed each day of hospitalization. It was flexible, individualised traetment enabling each person to progress at their own rate.

Conclusion: Our results suggests the need of further fully integrated approach of physical medicine rehabilitation and neuropsychiatry treatment as the future best solution for patient with mental disorders.

Key words: physical medicine, mental disorders, rehabilitation model

PAIN MANAGEMENT IN PATIENTS FOLLOWING LIMB AMPUTATION

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Introduction: Pain is a complex problem in patients following limb amputation. A number of entities have been described in literature and approved in practice in connection with types of pain, its causes, possible complications and applicable methods of medication therapy, as well as physical methods, psychotherapeutic and other therapeutic methods.

Materials and methods: Epidemiological study of pain conditions in lower limb amputees who were hospitalized in the Specialized Hospital for Rehabilitation and Orthopedic Prosthetics in Belgrade during the first three months of 2013. We used The Amputation Pain Questionnaire that was developed in our hospital. We recorded type of pain, its duration, intensity, frequency, type of medication and its effects in preprosthetic and prosthetic phase of the primary prosthetic rehabilitation. Methods of parametric and nonparametric statistics and statistical data processing were used.

Results: Thirty five lower-limb amputees completed the Amputation Pain Questionnaire. For 25 persons vascular disease was the cause of amputation and for 10 it was trauma. Age was 59,3 +/-12,2, Gender- 22 male, 13 female, 24 transfemoral and 11 transtibial level, Functional level(Narang) 5,2, comorbidity-20 HTA, 15 cardiac disorder, 2 pulmonal, 15 degenerative arthritis, 4 neuropathy. In preprosthetic part of rehabilitation there were 20 patients and in prosthetic 15. 31 persons had phantom limb sensations, 15 phantom limb pain (VAS-5,3), 10 residual limb pain (VAS-4,2), 10 prosthetic pain (VAS 2,3), 7 pain caused by another disease (VAS 6,2). Therapy that they had: drugs-12, kinesiotherapy- 35, physical therapy(electro, mecano, foto)-15, psychotherapy-5, another methods of therapy(desensitisation)-19. Our findings match the ones from the literature.

Conclusions: Every amputee has at least some kind of pain in preprosthetic preparation and prosthetic phase. Our experience confirmed that pain is one of the factors which influence the course and outcome of prosthetic rehabilitation. Thus, it is necessary to do an adequate review, apply numerous therapeutic methods and continuous control in order to achieve a higher functional level of an amputee.

Key words : Pain, amputation, prosthetic rehabilitation, therapy

THE ROLE OF ULTRASOUND FOR DETECTING ANKLE SYNOVITIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction: Clinical examination is difficult in patient with extraarticular swelling (subcutaneous oedema or tenosynovitis), obese patients and early arthritis. Ultrasound (US) allows visualisation of joint cavity widening due to synovial thickening and effusion. Early identification and suppression of synovitis limits the progression of the disease improving the long term prognosis. Objective of the study is to examine the significance of US in detecting ankle synovitis versus clinical examination in patient with rheumatoid arthritis (RA).

Materials and methods: 37 consecutive patients (23 female, 12 male), mean age 51 ± 12.6 , disease duration 6.1 ± 3.2 years, with RA (ACR criteria), and painful ankle joint were evaluated (talocalcaneal, talonavicular and talocrural joint). Clinical assessment consisted of joint tenderness and swelling detection. US examination consisted of synovial detection (synovial fluid or hypertrophy, using OMERACT definition) of talocrural, talocalcaneal and talonavicular joints. US examination were performed using a Voluson equipped with two linear probes 7.5-10 MHz and 10-14 MHz. US examination and clinical assessment were performed by two independent investigators at the same day, blinded to each other. The statistical analyses were performed using MedCalc for Windows XP. Interobserver agreement was calculated by kappa(k) statistic unweighted for dichotomous scoring e.g. presence/absence of synovitis).

Results: From the total of 74 joints, in 56.4% (42) joints, findings were the same, in 43.6% (32) joints were different. 36 joints were clinically inflamed, of which US detected synovitis in 27. From the rest of 38 joints, which were not clinically inflamed, US detected synovitis in 17. k value of US correlation with clinical examination was 0.301 showing fair agreement.

Conclusions: US showed to be more sensitive than clinical examination in detection of joint inflammation, tendon sheath effusion, extraarticular swelling and small synovitis in patients with RA.

Key words: ultrasonography, rheumatoid arthritis, ankle

INFLUENCE OF BALNEOPHYSICIAN THERAPY ON ACTIVITY AND FUNCTIONAL CAPACITY IN PATIENTS WITH SY CERVICALE

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Introduction: Balneophysician therapy is an important part of treatment for patients with sy cervicale.

Objective: To determine the influence of balneophysician therapy has a therapeutic effect on patients with sy cervicale.

Methods: A prospective clinical study included 50 patients. They were in the rehabilitation treatment in Atomic spa for three weeks. Treatment consisted hydrotherapy in , calcium-magnesium, hydrocarbon, oligomineral, hypothermia water (29°C), kinesitherapy, electrotherapy, magnetic therapy and lasertherapy. Used the following parameters before and after the completion of treatment: range of motion in the cervical spina (flexion and extension, rotation) HAQ index and VAS (scale from 0 - 100mm).

Results: 50 patients with sy cervical, 41 (82%) women and 9 (18%) men, mean age 62.54 ± 10.80 years, and the average duration of illness was 11.64 ± 7.86 years.

Flexion before and after treatment was, right (29.40 ± 8.18 vs 34.90 ± 6.66) and left (26.24 ± 7.09 vs 33.30 ± 5.58). Rotation to the right, before and after treatment was 55.70 ± 10.78 vs 62.40 ± 8.87 and rotation to the left 51.40 ± 9.47 vs 59.40 ± 8.36 . Distance between the chin and the sternum was 6.10 ± 2.27 before and 4.16 ± 2.10 after rehabilitation. HAQ scor before rehabilitation was 0.29 ± 0.27 and after that 0.20 ± 0.19 . VAS scale was 69.40 ± 14.48 before and 77.60 ± 13.93 after balneophysical treatment. Statistical analysis, Student t test, it is determined that the obtained difference value in cervical flexion before and after treatment, and left and right ,was statistically significant ($P < 0.05$), while the difference in values of the rotation, HAQ scor and VAS scale was statistically highly significant ($P < 0.001$).

Conclusion: The data analysis showed that the use of Atomic spa rehabilitation therapy for three weeks in patients with sy cervicale beneficial effect on reducing pain, increasing mobility and functionality that facilitate the activities of daily living.

Key words: balneophysician therapy, sy cervical

THE EFFECTS OF BALNEO FACTORS IN BANJA KOVILJAČA ON THE FUNCTIONAL DISABILITY AND QUALITY OF LIFE IN PATIENTS WITH LUMBAR DISCUS HERNIA

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Introduction: Clinically manifested discus hernia is a condition that can significantly change the life of an individual by disturbing one's everyday routines, changing one's role in a family, reducing work capabilities, and thus presenting a major health and socio-economical issue.

Aim: Test the effects of sulphuric water and peloid (mud packs) in Banja Koviljaca on the functional disability and quality of life in patients with lumbar discus hernia.

Materials and methods: Research was performed as a prospective study on 60 patients rehabilitated due to a lumbar discus hernia in sub-acute and chronic phase of the illness. The patients were divided into two groups of 30 patients – experimental and control. In the experimental group, peloid and sulphuric water of Banja Koviljaca were used, and in the control group, classical physical modalities were used. The estimate of the functional disability and quality of life of the patient was done using *The Oswestry Low Back Pain Disability Questionnaire* which was completed by the examinees themselves.

Results: By cross-analysis, a more favorable therapeutic effect was determined in the experimental group, that is, a significant reduction in drug intake (NSAIL/analgesics) was noticed in the post-rehabilitation period than in the control group. Based on the statistical analysis of the obtained values, a significant reduction in the Oswestry score in the post-rehabilitation period was noticed in both groups, however, a more significant improvement of the functional ability and quality of life was achieved in the experimental group, which improved from a severe disability zone to a moderate disability zone.

Conclusion: The results obtained in this research are a recommendation for the application of a complex spa treatment in patients with lumbar discus hernia, since it significantly contributes to a more successful outcome of non-surgical treatment methods, without any additional financial costs and excluding the risks connected to surgical treatment methods, and it also contributes to an improvement of the general functionality and quality of life of a patient.

Keywords: balneotherapy, peloid, sulphuric water, lumbar discus hernia

THERMOMINERAL WATER “SERBIAN SELTERS” IN REHABILITATION TREATMENT OF PATIENTS WITH REUMATHOID ARTHRITIS

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INTRODUCTION: The most important natural factor, which is used for therapeutical purposes is thermomineral water. Rheumatoid arthritis (RA) is an autoimmune disease that causes chronic inflammation of the joints. The aim of the work is to test and show satisfactory effects of natural factors in rehabilitation for patients with RA.

DESIGN: Retrospective of analyses had been for 40 patients, 34 female and 6 male, average age 60,7. Patients were divided in two groups, and cured in period of 15 days in rehabilitation centre.

MATERIAL AND METHODS: In both groups basic therapies were kinesytherapy and electrotherapy with analgesic effects “DD”. Only experimental group had specific procedures with thermomineral water, which due to Quentin’s classification is in the group of alcal muriotic carbondioxide hyperterms.

The temperature of water used in local application (hands) was 33 - 36 C° Followed parametres, were measured two times before and after the therapy: Analitic muscular test (MMT), scope movement of joints hands, scale of pain (VAS). Laboratory analyses, Health Assessment Questionnaire (HAQ), statistically significant $p < 0,05$., Wilcoxon,s test, Kolmogorov-Smirnov test, programmes SPSS and MS Excel.

RESULTS: Results are analysed with descriptive statistic method, and due to statistic analysing of facts. Before and after therapy according to MMT, there was no statistically significant association between the groups. $p > 0.05$ ($p = 0.329$), $p > 0.05$ ($p = 0.477$). Scope movement of hands joints: there is statistically significant association between the groups ($p = 0,00$). There was an improvement in dorsal flection only in experimental group. Labaratory analyses: there was no statistically significant association between the groups ($p > 0,05$). HAQ score: ($p > 0.05$), $p = 0.329$ before therapy, there was no statistically significant association between the groups. HAQ score in both groups after therapy the statistics improvement of score evident HAQ experimental group (0.195), $p = 0.00$., second group HAQ score (0.17), $p = 0.00$. In experimental group there was evident reduction of pain (VAS), after therapy, comparing with the control group ($p < 0,05$), $p = 0,001$.(Wilcoxon,s test, and Kolmogorov - Smirnov test)

CONCLUSIONS: Thermomineral water in combination physical therapy has positive effects on subjective discomfort and funcional status of patients with RA.

KEY WORDS: thermomineral water “Serbian Selters”, reumathoid arthritis, physical therapy

**BALNEOPHYSICAL THERAPY INFLUENCE ON CLINICAL AND BIOLOGICAL
PARAMETERS OF DISEASE ACTIVITY AND HEALTH CONDITION IN THE PATIENTS WITH
RHEUMATOID ARTHRITIS**

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Introduction: Rheumatoid arthritis is inflammatory systemic (organ nonspecific), autoimmune disease of unknown cause with chronic course that leads to progressive destruction of articular and periarticular structures. The early DMARDs therapy became standard of care that slows structural joint damage and improves quality of life. Optimal care of rheumatoid arthritis involves the use of balneophysical therapy which improves functional condition and quality of life in rheumatoid arthritis patients due to its favorable effects on clinical and biological disease activity.

Materials and methods: The aim of this study was to evaluate the influence of balneophysical therapy on disease activity and functional condition of patients with rheumatoid arthritis. The research included 33 patients: 29 (87,87%) woman and 4 (12,3 %) man, average age 64,78 (ranges 40 - 81), mean duration of illness was 22,06 years (ranges 8 - 30). They were diagnosed with rheumatoid arthritis based on American College of Rheumatology 1987 revised criteria at Rheumatology and Allergology Center of Clinical Center of Kragujevac. Between October 2010 and February 2013 patients were referred for 28 days to the Specialized Hospital for Rehabilitation Bukovička Banja of Aranđelovac. They underwent treatment with mineral peloid therapy (36°C, to 1 hour) and different forms of hydrotherapy such as general and local baths, underwater shower massage, aquatic exercises in mineral pool (30 min.), electrotherapy (dyadynamic currents: 3 + - CP and 3 + - LP, interferent currents 1-100 Hz for 15 min.), magnetotherapy (10 mT 50 Hz 30 min), kinesiotherapy (group or individual). Disease-modifying Anti-rheumatic Drugs dosage and glucocorticoids drugs dosage were stable during the rehabilitation period. Mineral water of Bukovička Banja is sodium - calcium - hydrocarbonat, carbonacid, homeothermal (34°C). The assessment of disease activity was performed at beginning and after the rehabilitation calculating DAS 28 (Disease Activity Score). Majority of patients (84,92 %) had moderate disease activity DAS 28 (3,2–5,1).

Results: Results of rehabilitation are objectified following measurement: length of morning stiffness, number of painful joints, number of swollen joints, VAS (visual analog scale) and sedimentation rate (mm/h). Statistical analysis was performed by descriptive methods (mean, SD, SE) while significance was tested using Student's t-test. At baseline the mean value of DAS 28 score was 4,86 while at the end point the mean value of DAS score was 4,06. The mean value of decrease in DAS 28 was 0,8. According to the DAS- based EULAR response criteria, a decrease in DAS 28 score of 0,6 -1,2 indicate a good treatment response.

Conclusions: A well - conceived balneophysical treatment is effective in the patients with moderate active rheumatoid arthritis. Balneophysical therapy combined with pharmacological therapy has beneficial effects on disease activity and quality of life.

Key words: rheumatoid arthritis, rehabilitation, DAS28

PAIN THERAPY IN PHYSICAL MEDICINE AND REHABILITATION

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Pain can be experienced in almost any location in the body, easily localized or generalized. The pain may be acute or chronic, and may range from a fleeting moment of sharp pain to lifelong and debilitating pain. Pain relieving drugs may be suggested or prescribed for any kind of pain, and patients run the risk of becoming addicted to many of the drugs that may be prescribed. Not all prescription painkillers are potentially habit -forming, it depends of kind of prescribed drugs, the duration of therapy and its dosage. Specific personality characteristics are also important for addiction susceptibility. Young people, especially those with psychic trauma and adults who have already abused other substances are more likely to fall victim to opioid addiction. Studies show that people who take their medications as directed and are regularly monitored by their physician are at the lowest risk for developing painkiller addiction, or having other associated complications. Key words: pain, painkillers, addiction, prevention

HYPERBARIC OXYGENATION EFFECTS ON PROSTHETIC REHABILITATION OF PATIENTS WITH UNILATERAL LOWER LIMB AMPUTATION

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Objectives: Hyperbaric oxygenation (HBO) has been proven to be very effective adjuvant procedure in the multidisciplinary approach to the treatment of gas gangrene, diabetic ulcers, other forms of chronic unhealing wounds and soft tissue necrosis. However, considering the mechanism of action of this method, it is clear that its therapeutic role does not end here. The aim of our study was to investigate the effects of HBO on the prosthetic rehabilitation of patients with unilateral lower limb amputation.

Methods: Sixty patients (age 61.6 ± 11.5 , male 30, female 30) with unilateral lower limb amputation were randomly divided into two groups (30 patients in each group): experimental group received HBO treatment (five times a week, for 5 weeks, pressure 2.5 ATA for 90 minutes, in multiple chamber), and control group. Both groups were subjected to the assessment of functional competence of amputated stump, by using LCI test and Narang's score.

Results: At the beginning of the study there were no statistically significant difference between the values of LCI and Narang's score among these two groups. After the period of prosthetic rehabilitation in both groups significantly higher LCI scores were registered. Lower Narang's score were also registered in both groups. However 5 weeks later, LCI scores were statistically significantly higher in experimental group compared to the control, and at the same time values of Narang's scores were statistically significantly lower in the group of patients that were exposed to HBO.

Conclusions: Our results clearly show that in case of a relatively homogeneous group of patients, standard therapy and prosthetic rehabilitation with adjunct of HBO provided better functional capacity of these patients. These findings highlight the increasing validity of this procedure after limb amputation, which should be confirmed by further research in multicenter studies involving a larger number of respondents.

Keywords: hyperbaric oxygenation, prosthetic rehabilitation, amputation

VITAMIN D STATUS IN MEN WITH LOW BONE MINERAL DENSITY AND OSTEOPOROTIC FRACTURES

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Introduction: Osteoporosis is a well - recognized problem in older women. There has been insufficient awareness among both the public and the medical profession that osteoporosis is also a common problem in older men. Vitamin D, its active metabolites and analogues represent the group of compounds with numerous functions within the organism. The primary role of vitamin D is in the metabolism of phosphorus and calcium. The aim of study was to determine and compare prevalence of vitamin D inadequacy in male population with low bone mineral density (BMD) and presence of osteoporotic fractures.

Materials and methods: Our study was performed from November 2010 to November 2011 and included 122, 65,2 ± 15,8 years old men referred to Railway Healthcare Center in Belgrade for DXA lumbar spine and hip scan. Low bone mineral density was detected in all our participants (average BMD on lumbar spine was 0,732 ± 0,243, on femoral neck 0,614 ± 0,231 and total hip 0,756 ± 0,234). Following the ISCD protocol Vertebral Fracture Assessment (VFA) was performed in all participants during same visit, on Hologic Discovery C device, in aim to detect vertebral fractures. Vertebral bodies were analyzed by semiquantitative Genant method and Grades II and III considered in study. In all participants serum level of 25 - hydroxyvitamin D (25O HD) were measured. We used 75 nmol/l as the cut off point defining vitamin D inadequacy. Vitamin D status was categorized in three groups: normal (25O HD > 75 nmol/l), insufficiency (25 nmol/l < 25O HD < 75 nmol/l) and deficiency (25O HD < 25 nmol/l). All participants were done Ca, Ca⁺⁺, P, ALP, PTH, vit. D in blood and Ca, P in 24 h urine. Causes of secondary osteoporosis were excluded. The results were interpreted according to the current definition of osteoporosis. In statistical analysis we used descriptive statistic and Student T- test.

Results: Vitamin D inadequacy was observed on 108 (88,52 %) of all the patients: 74 (68,52 %) had insufficiency and 34 (31,48 %) had deficiency. 122 participants were divided into two groups. Group I included 60 patients without previous fracture and Group II with 62 patients with previous fracture. Average value of 25OHD in Group I was 52,83 ± 24,63 and in Group II was 45,7 ± 16,29. This difference is considered to be statistically significant (p < 0,05). Patients from Group II were divided into two groups: Group II A, 30 patients with vertebral fractures and Group II B, 32 patients with nonvertebral fractures (forearm – 24 (75 %), hip – 5 (15,62 %), humerus – 3 (9,38 %)). The serum level of 25O HD in Group II A was 40,39 ± 14,21 and in Group II B was 50,36 ± 18,7. This difference is considered to be very statistically significant (p = 0,01). In Group I 9 (15 %) patients, in Group II A 16 (53,33 %) and in Group II B 9 (28,13 %) were older than 70 years.

Conclusions: This study confirms that vitamin D inadequacy is highly prevalent in Serbian male population with low bone density. Adequate vitamin D supplementation may significantly improve bone health in this population.

Key words: men, vitamin D, bone mineral density, fractures

**USING THE OXFORD SHOULDER SCORE IN ASSESSMENT OF QUALITY OF LIFE AND
EVALUATION OF CLINICAL CONDITION OF SHOULDER JOINT DISORDERS**

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Introduction: The Oxford Shoulder Score is used for assessing and measuring patients' quality of life as well as the functionality of shoulder joint within different pathological conditions such as rotator cuff disorder, shoulder joint injury, postoperative condition etc. The main aim of this effort was to assess whether The Oxford Shoulder can be effectively used to monitor rehabilitation process in addition to the final treatment outcome as well as its potential for using in assessing patients' capability for everyday activities and work activities too.

Methodology and materials: A total of 25 patients who had been selected on the bases of anamnesis and clinical findings were included in this study. The medical history was obtained during the period January 2013-May 2013 from Institute of Orthopedics, Physical Medicine and Rehabilitation *Dr Miroslav Zotovic*, Banja Luka. The *standard* questionnaire of the Oxford Shoulder Score was used along with measuring of sick shoulder range movement prior the therapy and subsequently to 10 therapy procedures. Descriptive statistic and analysis were done by a non-parametric Mann-Whitney's test.

Results: Statistically significant progress of quality of life and clinical condition after the therapy was confirmed - within risk level of 5% (evaluated by the Oxford Shoulder Score questionnaire) in all treated patients with shoulder joint disorder.

Conclusions: The Oxford Shoulder Score questionnaire has considerable contribution in assessment of functionality of suffering shoulder joint. It is also an indicator for evaluation of medical treatment and rehabilitation therapy that are performed after different pathological conditions, and it is necessary to be used in all medical clinics trained to accomplish physical therapy.

Keywords: Oxford Shoulder Score, Shoulder disorder

SARCOPENIA AND VERTEBRAL FRAGILITY FRACTURE

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Introduction: Increased life expectancy is associated with a greater frailty of elderly people and a higher prevalence of chronic and degenerative diseases, including osteoporosis. In Italy there is an high incidence of fragility fractures (1). Sarcopenia was significantly associated with osteoporosis in a large sample of women following a hip fragility fracture (2). Prevalence of sarcopenia in patients with vertebral fractures is largely unknown. The aim of our study is to investigate the frequency of sarcopenia in women who sustained vertebral fragility fractures.

Materials and methods: In this pilot retrospective study we evaluated data of white women that referred to a Physical Medicine and Rehabilitation outpatients' Department with a diagnosis of osteoporotic vertebral fracture. In this study we included women of 55 years old or older. Women with secondary osteoporosis or pathological vertebral fractures were excluded from the evaluation. Dual-Energy X-Ray Absorptiometry (DXA) was used to measure whole and regional body composition. Appendicular lean mass (aLM) was calculated as the sum of lean mass (LM) in arms and legs. We calculated the skeletal muscle mass (SMI) index (aLM/height squared), and we measured bone mineral density (BMD) and T-scores by DXA scan at total-body and at femoral neck. Participants were divided according to the number of vertebral fractures (single or multiple fractures).

Results: A total of 67 women were included. Thirty-five women (52.23%) had a vertebral fracture. Of them 8 (22.85%) were sarcopenic. Thirty-two women (47.76%) had multiple vertebral fractures. Of them 14 (43.75) were sarcopenic. Our results suggest that sarcopenia is common among osteoporotic women increasing along with the number of vertebral fragility fractures.

Conclusions: The results of our study suggest that sarcopenia is common among osteoporotic women, increasing along with the number of vertebral fragility fractures. Further studies are needed to demonstrate a correlation between sarcopenia and osteoporosis both in terms of physiopathological and clinical aspects. Increasing the knowledge of these conditions would improve the therapeutic approach that counteract the onset of disabling complications.

Key words: Sarcopenia, Vertebral fractures, Osteoporosis, Dual-Energy X-Ray Absorptiometry

ANATOMICAL DAMAGE OF WRISTS AND BONE MINERAL DENSITY IN FEMALE PATIENTS SUFFERING FROM RHEUMATOID ARTHRITIS

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Introduction. Rheumatoid Arthritis (RA) is a systemic, autoimmune, chronic, inflammatory disease, which is, in its clinical picture, most clearly reflected on joints- juxtaarticulare and systems osteoporosis.

The objective of the paper. To study the level of anatomical damage on wrists and bone mineral density in female patients suffering from RA, and then to study as to whether there is a correlation between these changes.

Materials and methods. The cross-sectional study covered 100 female patients suffering from RA, who were treated at IV and VI Departments of the Institute of Rheumatology from November 2006 to November 2007. On all the female patients, osteodensitometry was performed in the first year after the diagnosis had been made and X-ray images of wrists were also made. The level of anatomical damage on wrists was monitored and assessed applying the Larsen method. A higher value of the Larsen index indicated a poorer condition of the analyzed wrists. Thereafter, a correlation was made between the values of the T score and the values of the Larsen index.

Results. In the studied sample of female patients, the total value of the Larsen score was 40.46 ± 18.38 . By stratification of the values of the scores for the left and the right wrist, it was noticed that the value of the left wrist Larsen score was 20.11 ± 9.27 and, of the right one, it was 20.35 ± 9.44 , without a statistically significant difference ($t = -0.696$, $p = 0.488$).

The total value of the Larsen index was 2.05 ± 1.02 . By stratification of the values of the scores for the left and the right wrist, it was noticed that the value of the left wrist Larsen index was 2.23 ± 1.03 and, of the right one, it was 2.26 ± 1.05 . Bone mineral density was measured in all the female patients and, in 32 (32%), osteoporosis was established (the T-score -3.35 ± 1.35). From the moment of verification of osteoporosis, 3.41 ± 1.80 years (from 1 to 5 years) passed on average. In this study, the level of wrist damage in female patients suffering from rheumatoid arthritis was also studied in relation to osteoporosis. This type of analysis demonstrated that there was a statistically significantly higher level of anatomical damage in the group of female patients suffering from osteoporosis as compared to the female patients without osteoporosis ($\chi^2 = 11.355$, $p = 0.045$).

Conclusion. Osteoporosis was diagnosed in 32 female patients suffering from rheumatoid arthritis. The Larsen index is statistically highly significantly correlated with the values of the T score.

**BONE METABOLISM OF MALE HYPOGONADIC PATIENTS TREATED WITH
TESTOSTERONE REPLACEMENT THERAPY (TRT)**

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Introduction: Male hypogonadism is a clinical syndrome characterized by low levels of testosterone associated with infertility, changes in mood, fatigue and anger, decrease in muscle mass and strength, loss of bone mass. Recently the attention has been focused on a possible reciprocal regulation bone - gonads, in particular on a regulation of male fertility by the skeleton through the action of osteocalcin.

The aim of our study is to evaluate in male patients with primary and secondary hypogonadism the interaction between the endocrine - metabolic and musculoskeletal functions, the alterations of body functions and structures related to movement, any restriction of social participation and the consequent deterioration in the quality of life.

Materials and methods: This observational study was conducted in collaboration with the Department of Clinical and Experimental Internistics of our University. All patients with a diagnosis of hypogonadism, that were sent to our observation, were receiving a pharmacological treatment with testosterone. They underwent a DXA examination, a physical examination including the assessment of muscle strength (MMT scale), presence and intensity of any kind of pain with the Brief Pain Inventory (BPI), disability (Barthel Index), and quality of life with the Short Form -12 (SF - 12).

Results: Up to date, 51 male patients aged between 17 and 55 years were evaluated; 17 patients were overweight and 5 were obese. Nine patients had a diagnosis of Klinefelter syndrome, 32 Kallmann syndrome, 8 idiopathic hypogonadotrophic hypogonadism (IHH), 1 multiple pituitary deficit and 1 a primary hypogonadism after orchiectomy for bilateral testicular cancer. At the DXA examination 15 patients were osteopenic (T-score value between -1 and -2.5) and 3 were osteoporotic (T-score < -2.5). Thirty patients were practicing a sport. Fifteen patients reported musculoskeletal pain of mild-moderate intensity (BPI range 2.71 - 4.57), 7 patients had a mild muscle weakness against resistance (MMT = 4/5). One patient had changes in activity and social participation (Barthel Index = 75/100) and in the quality of life (PCS = 38,30; MCS = 41,56).

Conclusions: Testosterone replacement therapy (TRT) in these patients can restore sexual function, lead to an increase of energy, sex drive and sense of well - being, but also prevent muscular atrophy and bone loss. Hypogonadism is a complex clinical syndrome which comprises symptoms and signs as well as testosterone deficiency; a multi-dimensional diagnostic evaluation that includes the parameters of the muscular-skeletal metabolism, as proposed in our protocol evaluation, might lead to a more satisfactory therapeutic perspective and then to a possible improvement of quality of life of these patients.

Key words: hypogonadism, testosterone, DXA

THE INFLUENCE OF THE DURATION OF THE DISEASE, AGE AND SEX ON FATIGUE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid arthritis (RA) is a chronic, systemic, inflammatory disorder of unknown etiology. Active RA leads to impairment in physical function, limiting activities and decreasing QOL. **Objective:** The aim of this study is to estimate the influence of the duration of the disease, age and sex on fatigue in the patients with rheumatoid arthritis.

Materials and Methods: This research included 66 RA patients, according to ACR criteria. Fatigue was rated visual analogue scale (VAS), the SF-36 vitality scale, questionnaire Facit Fatigue Scale (FFS) and the Fatigue Severity Scale questionnaire (FSS). For statistical analysis of the data used the analysis of variance (ANOVA), t-test.

Results: Of the 66 patients were 51 female and 15 male. Fatigue is present in patients of both sexes, was more pronounced in women, evaluated all the questionnaires but without statistical significance. In relation to age, patients were divided into three groups. There is a pronounced fatigue in older patients evaluated all the questionnaires, although without statistical significance. In relation to duration of the disease, were divided into three groups. The patients with disease duration longer than 10 years had the highest average value of fatigue VAS scale 65.90 ± 21.46 compared to group with duration of disease is 6-10 years, 46.75 ± 17.00 and compared to group with duration of disease 1 to 5 years 47.13 ± 18.53 in the presence of high-statistically significance $p = 0.001$. The patients with disease duration longer than 10 years had the worst average value of scale vitality questionnaire SF36 32.33 ± 20.66 compared with the patients in duration of disease is 6-10 years, 46.25 ± 16.25 and compared to group with duration of disease is 1 to 5 years 46.04 ± 12.15 with the existence of high-statistically significance $p = 0.000$. The patients with disease duration longer than 10 years had the worst average value of FSS questionnaires 44.30 ± 15.32 compared to those in whom the disease is 6-10 years 30.67 ± 8.21 and compared to those in whom the disease lasts up to 5 years 29.21 ± 10.81 in the presence of high-statistically significance $p = 0.008$. The patients with disease duration longer than 10 years had the worst average value of the questionnaire FFS 19.10 ± 9.36 compared to group with duration of disease is 6-10 years 28.67 ± 8.23 and compared to group with duration 1-5 years 29.63 ± 7.61 in the presence of high-statistically significance $p = 0.000$.

Conclusions: All patients with RA had fatigue. Fatigue is stronger in women and older patients but without statistical significance. Disease duration longer than 10 years leads to severe degree of fatigue in compare to patients with duration of the disease is 6-10 and 1-5 year with statistically significant.

CHANGES OF THE GAIT CYCLE IN RELATION TO GENDER, WEIGHT AND HEIGHT

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Introduction: It's well known that changes in weight and gender, determining differences in terms of muscle strength, muscle power and redistribution of fat tissue, influence the quality of the walking. Up to date, there is no scientific evidence supporting this thesis; therefore the aim of our study is to quantify the relationship between gender, height, weight and stepping parameters. **Materials and methods:** We examined four walking variables: swing, rolling, duration and frequency of the step in a group of students that attend a high school in Naples. As evaluation tool, we used a mobile inertial sensor G walk® of BTS equipped with Bluetooth support, positioned at level of L5 and connected to a PC for processing data. The data were subsequently crossed with the anthropometric variables gender, height and weight.

Results: One hundred and sixty-two students were enrolled; 72 females and 90 males with mean age of 16.30 years (min 14 max 19). We divided subjects into three classes: underweight (<5°percentile), normal weight (5°- 85°percentile), overweight (>95°percentile). The students who were underweight were 39 (28 females and 11 males), 88 were normal - weight (38 females and 50 males) and 35 overweight (7 females and 28 males). We have not detect significant differences, in both males and females, regarding the percentage of rolling, the duration and the frequency of the gait cycle, in each of the three classes. There was a progressive decrease in the percentage of oscillation between the first, second and third class in both genders. In females there was a value of 36.02% in the first class, of 35,27% in the second and of 35.11% in the third class, while in males the percentage of swing was 36.69 in the first class, 36.40% in the second and 36.13% the third class. **Conclusions:** There aren't statistically significant differences between two genders and three classes regarding the percentage of rolling, the duration and cadence of the step. However, we have noticed a decrease in the percentage of swing and an increase of ratio weight/height.

Key words: gait cycle, growth percentiles

THE ROLE OF THE EARLY REHABILITATION AFTER TOTAL KNEE ARTHROPLASTY IN RHEUMATOID ARTHRITIS AND OSTEOARTHRITIS

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In the case of rheumatoid arthritis and osteoarthritis total knee arthroplasty represents the most frequently applied surgical treatment.

The aim of this research was to evaluate the results of rehabilitation in patient with knee arthroplasty in order to improve the functional status and the quality of their life.

102 patients with an implanted total knee endoprosthesis were analysed - 38 of them with rheumatoid arthritis and 64 patients with osteoarthritis. The rehabilitation treatment was applied for a period of three weeks. The tests were used to cover all objective and subjective parameters: before surgical intervention, and during control examinations over a period of three, six and twelve months after the surgical intervention. The pain was tested by means of the visual analogue scale. In order to determine the functional status of patients with rheumatoid arthritis the Health Assessment Questionnaire was used, whereas the Lequesne's index was applied in patients with osteoarthritis. The quality of life in both test groups was assessed by a modified SF 36 (Short Form Health Survey).

In both test groups the functional status in RA patients was raised by an average of 1.99 to 1.87 ($p < 0,005$) and in OA patients the functional status at the beginning of the rehabilitation was 13 points on average and in the end 7.89 points ($p < 0,005$). As the result, the patients could carry out their everyday activities with more ease, *which* improved their quality of life (in patients with rheumatoid arthritis $t=22,86$, $p > 0,05$; in patients with osteoarthritis $t=29.07$, $p<0,05$).

To conclude, early rehabilitation after knee arthroplasty significantly improves the functional status and quality of life in patients with rheumatoid arthritis and osteoarthritis.

Key words: rehabilitation, rheumatoid arthritis, osteoarthritis, functional indeks, quality of life.

THE PHYSIOLOGICAL COST INDEX: IS THERE A CORRELATION WITH THE ENERGY COST OF WALKING IN TRANS - TIBIAL AMPUTEES? PRELIMINARY DATA

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Introduction: Motor impairments frequently result in increased walking expenditure. This may limit the independence and community life of individuals with motor disorders. Although oxygen consumption ($\dot{V}O_2$) measurements are the primary choice for assessing energy expenditure, they are cumbersome, the instrumentation needed is expensive, and the methodology requires trained personnel. Thus, for estimating energy expenditure, other methods have been used instead, including the Physiological Cost Index (PCI). As reported in the literature, the PCI is an easy and cheap way to evaluate the $\dot{V}O_2$ and obtain an index of energy expenditure and energy cost in individuals, in relation to their own heart rate during exercise. Several authors have conducted studies about the use and properties of the PCI, in different patients with different ages (children, elders). Nevertheless there is still not agreement, on this topic, among the researchers. So, the aim of our study was to assess if there is a correlation between PCI and Energy Cost of Walking (ECW) in unilateral trans-tibial amputees (TTAs).

Materials and methods: To accomplish the aim of the study, unilateral traumatic TTAs, active and without comorbidities, were selected from our database. Their data refer to six minute walking tests (6MWT) on floor during 1 year observation period while using 2 different prostheses components. The TTAs conducted all 6MWTs walking at their own self selected speed. During 6MWTs $\dot{V}O_2$ and Heart Rate (HR) were collected by means of K4b² (Cosmed, Italy). The time length of 6MWT was enough to reach the steady state phase (SSP) for HR and $\dot{V}O_2$. SSP data were used to calculate ECW and PCI. The Spearman's correlation coefficient (ρ) was computed to assess the correlation between ECW and PCI. Statistical significance was set at $p < 0.01$.

Results: The involved TTAs were 7 males, mean age, weight and height were: 40.7 ± 10.1 , 174.7 ± 6.8 , 77.3 ± 15.8 respectively. The 6MWTs considered were 66; 4 TTAs failed to complete the 10 evaluations in the observation period. The PCI resulted weakly, but significantly, correlated with the ECW: $\rho = 0.373$, $p = 0.002$.

Conclusions: On the basis of our results, PCI seems to be a simple, easy and cheap method to have directions in clinical settings, where more expensive and sophisticated instruments are often lacking. Even if our data showed a correlation between ECW and PCI, the ECW still remain the gold standard; thus caution is mandatory in managing this tool. A greater sample size and a deeper data analysis is needed to better evaluate PCI usefulness in TTAs.

Key words: Lower limb amputation, walking, physiological cost index, energy cost of walking

EFFECTS OF WHOLE BODY VIBRATION ON PELVIC FLOOR MUSCLES IN HEALTHY WOMEN

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Introduction: Whole - body vibration (WBV) is a neuromuscular training method initially used in elite athletes to improve speed - strength performance. Recently it is becoming popular in health and fitness clubs as an alternative training method. There is some evidence that WBV is as efficient as physical fitness training but is also reported a case of hematuria after WBV training. There is a lack of scientific research concerning the effect of whole body vibration on the pelvic floor muscles. The aim of this randomized controlled trial is to investigate the influence of sinusoidal whole body vibration on the pelvic floor muscles in sedentary healthy women.

Materials and methods: From November to April were assessed for eligibility 95 healthy sedentary women. 63 were excluded from the study (35 subjects didn't meet the inclusion criteria; 28 declined to participate). The authors enrolled and randomized in two groups 32 subjects. In each group the subjects were standing in the squat position on a WBV platform. Pelvic floor muscle activity was assessed every 15 s by means of a manometric vaginal probe connected to a myography and neurostimulator device (MYOMED 632 - Enraf Nonius - Medimar). The evaluation session occurred for 45 s. In the experimental group the vibration energy was supplied through Galileo 2000 platform at 30 Hz with an amplitude of 4 mm. A sham platform (worthless vibration) was provided for the control group.

Results: Our data show an increasing activity of the pelvic floor muscles during the vibration session in the experimental group compared to the control group.

Conclusions: WBV seems to recruit pelvic floor muscles in healthy sedentary women. This study open to new perspectives on treatment of pelvic floor dysfunctions; however, more scientific studies of safety should be conducted, due to an increasing of popularity of the WBV platform in fitness and gym centers as a training method.

Key words: whole body vibration, pelvic floor muscles training, rehabilitation

ASSESSMENT OF FUNCTIONAL RECOVERY DURING EARLY REHABILITATION OF PATIENTS IN THE ORTHOPEDIC WARD – CONCURRENT VALIDITY OF THE A-TEST

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Introduction: The population of patients in the orthopedic ward is heterogeneous, and this is the situation in all general hospitals. Surgical treatment is followed by early rehabilitation which usually lasts a short time, only a few days. Adequate assessment of the functional recovery of patients in this period is important, not only for monitoring regaining functional ability, but also for an adequate dosage of physiotherapy and planning further rehabilitation. Simple instruments are needed to monitor the rehabilitation process, presenting the results of the work, conducting clinical studies. However, there are little tests that cover this period of rehabilitation. These tests are related to specific clinical entities: the University of Iowa Level of Assistance Scale (ILAS) was created to assess functional recovery of patients after hip and knee arthroplasty and the Cumulated Ambulation Score (CAS) is used to evaluate functional recovery in the first days after the surgical treatment of hip fractures. We designed the A-test for assessment of functional recovery during early rehabilitation of patients in the orthopedic ward. This performance based test consists of 10 items for assessing basic activities by six level ordinal scale (0-5). Total scores can range from 0 to 50, or inability to perform any activity despite the help of therapists until complete independence and safety in performing all activities. The aim of this study was to examine the A-test concurrent validity.

Materials and methods: Design: measurement-focused study. Setting: orthopedic ward, 1st-5th day of early inpatient rehabilitation. Population: 60 patients with hip osteoarthritis that underwent arthroplasty and 60 surgically treated patients with hip fracture. Methods: Concurrent validity refers to the ability of an instrument to assess the current state of the patient. The instrument is compared with the existing measurement tool (the criterion). Since the validity of the ILAS was confirmed in patients after hip and knee arthroplasty, we examined the correlation between A-test and ILAS in patients with hip osteoarthritis who underwent arthroplasty. On the other hand, the validity of the CAS has been demonstrated in patients with hip fracture, so we correlated A-test results with the results of CAS in this patient group. Data analysis: Spearman rank correlation.

Results: Strong correlation of A-test and ILAS results for patients with hip osteoarthritis, $r = -0.97$, $p = 0.000$ and A-test and CAS results for patients with hip fracture, $r = 0.91$, $p = 0.000$.

Conclusions: The A-test is simple and valid instrument for everyday evaluation of pace and degree of functional recovery during the early rehabilitation of patients surgically treated on orthopedic ward because of hip fractures and hip osteoarthritis.

Key words: hip arthroplasty, hip fracture, validity, early rehabilitation, assessment of functional recovery

COMPARISON OF ELECTRODIAGNOSTIC TESTS AND MAGNETIC RESONANCE IMAGING IN MUSCLE DENERVATION SECONDARY TO ULNAR AND MEDIAN NERVE INJURIES

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Introduction: The diagnosis of peripheral nerve injury has been traditionally based on clinical and electrodiagnostic examinations. However electrodiagnostic studies, especially needle electromyography are painful, invasive, and hard to tolerate for some patients. Also, electrodiagnostic studies could be misleading in cases with anatomic variations of the peripheral nerves. Furthermore discrepancies occur between interpretation of the electrodiagnostic studies due to the timing of the examination and physicians' experience. In recent years there has been an increasing evidence that magnetic resonance imaging (MRI) can significantly aid in the diagnosis of peripheral nerve injury and muscle denervation. The aim of this study was to determine the diagnostic utility of MRI in detecting denervated muscles in cases of focal median and ulnar nerve lesions compared to electrodiagnostic tests.

Materials and Methods: A total of 40 patients diagnosed as either median/ulnar nerve injury, carpal tunnel syndrome or ulnar entrapment neuropathy according to electrodiagnostic examinations were included in this study. Patients with signs of muscle denervation and and/or motor unit loss in needle electromyography underwent MRI evaluation. Coronal and axial fat-suppressed (FSPD) and short tau inversion recovery (STIR) sequences with 3mm slice thickness was obtained and evaluated for the existence of muscle edema.

Results: A significant association was found between both denervation and motor unit loss in needle electromyography and increased signal intensity in STIR MRI ($p=0.007$ and $p<0.001$). However when we considered denervation findings in needle electromyography as the reference parameter, the diagnostic sensitivity of MRI was found 40.9% and specificity was found 94.3%.

Conclusions: This study showed that the sensitivity of MRI in diagnosing muscle denervation is low and for this reason electrodiagnostic tests can be accepted as gold standart in diagnosing muscle denervation due to peripheral nerve injury. However, MRI may be a useful adjunct diagnostic tool in cases which electrodiagnostic tests could not be performed.

Keywords: Muscle denervation, Electromyography, Magnetic resonance imaging

KACLIR TEST; A SUGGESTED ASSESSMENT METHOD AFTER ACL RECONSTRUCTION

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Introduction: Purpose of this study is to detect the value of combining surface Electromyography (sEMG) and whole body vibration (WBV), in evaluating the functional recovery of the quadriceps muscle after an anterior cruciate ligament (ACL) reconstruction, using the KACLIR (Knee Anterior Cruciate Ligament Reconstruction) test.

Materials and methods: 10 subjects were included in this study divided into 2 groups. Group I was formed by 5 patients who had unilateral ACL reconstruction at least 1 month before, while Group II was formed by 5 healthy subjects as a control group.

The measures were taken through the KACLIR test by using a sEMG, with electrodes placed at the vastus medialis and lateralis bilaterally, during knee extension without resistance and during whole body vibration (WBV). The results were elaborated with the KACLIR App, an Excel file that allows visualizing the data of the test of each subject.

The evaluation in Group I was applied twice. At T1: at least 1 month after surgery and T2: 2 months later, after submitting a rehabilitation program. Evaluation in Group II was performed once.

Results: At T1 it was evidenced that the extension velocity of the operated knee was reduced by 19% respect to the healthy side, with an increase of the neuromuscular recruitment in Group I. The sEMG values of the healthy knee in Group 1 were remarkably higher in respect to the values of the healthy subjects in Group 2. At T2, after two months of rehabilitation program in Group I, KACLIR test showed that the values between both knees tended to equalise.

Conclusion: The combination of whole body vibration and sEMG recordings (KACLIR test) can detect the impairment as well as monitor the progress of the rehabilitation program for quadriceps muscle after ACL reconstruction. With the KACLIR App we are able to analyze and save the data from the KACLIR test and compare the results in a temporal manner. It is considered a well-tolerated applicable assessment and follow-up method for pathological and also physiological conditions.

Key words: KACLIR, sEMG, whole body vibration, quadriceps muscle, ACL

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MANAGEMENT OPTIONS OF CHRONIC LOW BACK PAIN: A RANDOMIZED BLINDED CLINICAL TRIAL

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Introduction: Chronic low back pain (CLBP) is the most common cause of long term disability in many world countries. It is common problem in primary care facilities and is notoriously refractory to conventional drug treatment. It seems there is no one treatment modality that is effective for all patients. Current multidisciplinary approach in the management of chronic low back pain, considers it as the consequence of combined effects of multiple arrays of interrelated physical, psychological, social and occupational factors.

The objective of the study is to compare efficacies of two active programs in management of CLBP.

Materials & Methods: This study was conducted in the department of Rehabilitation medicine, King Abdullah University hospital, Irbid, Jordan, between January and October 2009. A total of 100 patients were randomized to either 6 - weeks of multidisciplinary rehabilitation (group A) or therapist assisted exercise (group B). At baseline and 6 weeks, visual analogue scale (VAS) was estimated, as a primary outcome measure. Mc Gill and Oswestry disability scales, trunk forward flexion and extension, left and right lateral bending, were applied before and after treatment as secondary outcome measures.

Results: All outcome measures significantly improved in group A after treatment, compared to group B. VAS, Mc Gill, Oswestry disability scales, left and right lateral bending decreased significantly ($p = < 0.05$), whereas forward and backward bending increased ($p = < 0.05$). Significant number of patients returned to work ($p = < 0.05$) in group A at end of 6 weeks, compared to group B. These effects were maintained over 12 and 24 weeks follow-up.

Conclusion: Multidisciplinary rehabilitation improved functional indices and pain scales in group A compared to B. This might be an effective strategy in CLBP management.

Key words: chronic low back pain, multidisciplinary management, pain and disability scales

HIGH RESOLUTION ULTRASONOGRAPHY OF WRIST AND HAND

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Introduction: High resolution ultrasonography with high frequency probe-10-13 MHz, Doppler and Power ultrasonography has increased role to evaluate superficial structures of wrist and hand - tendons, joints, nerves and vessels.

The point of this work is to presence the normal anatomy finding of wrist and hand and describe wide spectrum of inflammatory, traumatic disease, entrapement neuropathies, and in this way delineate the nature and extent of the process.

Materials and methods: In this article we made examinations in 12 patients. All images were acquired by using ultrasound machine My lab 70 ESAOTE, with 10-13 MHz linear transducer. We used Doppler and Power ultrasound.

Results: Classic radiology can diagnosis bone and articular lesions while ultrasonography assesses different disorder of soft tissue. Some lesions cannot be detected by ultrasonography and require some invasive and expansive imaging modality (CT, MRI, MRI arthrography,...)

In first part of this article we described and illustrate normal anatomy of the wrist and hand –

- extensor tendons surface, six compartments and his attachment of radius and ulna - flexor surface of the wrist, n . medianus and ulnar nerve.

In second part we illustrate ultrasonography findings in tenosynovitis of wrist and hand, finger flexor pathology, carpal tunnel pathology, traumatic disorders.

Conclusions: Because of own characteristic – noninvasive, rapid, dynamic, low cost and repeatible technique high resolution ultrasonography is a first imaging technique in evaluation of wrist and hand disorder

Key words: hand , wrist, high resolution ultrasonography, flexor, extensor tendons

INFRARED THERMAL IMAGING IN EVALUATION OF INTERFERENTIAL CURRENTS IN THE TREATMENT OF COMPLEX REGIONAL PAIN SYNDROME

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Introduction Infrared thermal imaging is a non-invasive, non-contact and objective method, that provides information about vascular changes in complex regional pain syndrome, which allows monitoring of the course disease and efficacy of therapeutic procedures. The aim of this study is to evaluate, by using infrared thermal imaging, the effects interferential currents in the treatment patients with complex regional pain syndrome type I.

Materials and methods The study was conducted at the Clinic for Physical Medicine and Rehabilitation of the Clinical Center Nis (Serbia) from December 2004 to January 2007. The prospective randomized study included 25 patients with unilateral post-traumatic complex regional pain syndrome type I in the first stage, who had been diagnosed clinically on the basis of the modified research diagnostic criteria defined by the Budapest consensus group. Patients were treated with interferential currents and kinesiotherapy. Bipolar interferential current therapy was applied, with 90 Hz frequency, for 15 minutes with electrodes positioned locally on the painful and swollen part. The patients from both groups received the first 10 therapies every day for 5 days a week (2 weeks), and the next 10 therapies were received every other day. The regions of interest were filmed by infrared thermovision camera Varioscan high resolution 3021 on both sides, before and after the 20 therapeutic procedures had been applied. Thereafter the quantitative analysis and the comparing of thermograms taken before and after the applied therapy were performed.

Results The quantitative analysis of the thermograms, before the applied therapy, was measured the mean maximum temperature difference between of the injured and the contralateral extremity ($\Delta T_{\max}$) $1.26 \pm 0.77^{\circ}\text{C}$, which after the applied therapy was reduced to $0.65 \pm 0.67^{\circ}\text{C}$. By comparing the thermograms, it was established that there was statistically significant decrease of the mean maximum temperature difference between the injured and the contralateral extremity after the therapy in comparison to the status before the therapy ($t = 8.827$; $p < 0.01$).

Conclusion By the use of the infrared thermal imaging we showed that interferential current therapy is effective in the treatment of complex regional pain syndrome type I in the first stage.

Key words: Complex regional pain syndrome, interferential currents, infrared thermal imaging

THE SIGNIFICANCE OF OXFORD HIP QUESTIONNAIRE IN ASSESSING ABILITIES TO PERFORM ACTIVITIES OF DAILY LIVING AFTER HIP ARTHROPLASTY

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Introduction: Hip arthroplasty is a routine surgical procedure which relieves pain and improves movement in patients with osteoarthritis. After surgery and rehabilitation treatment, patients experience improved performance in activities of daily living. The aim of this study was to analyze subjective well-being and abilities to perform certain activities of daily living prior to and after rehabilitation treatment.

Materials and Methods: A modified Oxford Hip Score Questionnaire was used in 145 patients with total hip replacement treated at the Medical Rehabilitation Clinic. Patients completed the questionnaire prior to rehabilitation treatment (4 – 5 weeks after surgery) and at discharge. The rehabilitation lasted 3 weeks on average.

Results: On admission, the mean Oxford Hip Score was 20,63 (satisfactory result), and 14,16 (good result) at discharge. After physical treatment, 44% of patients reported significant pain relief. In terms of activities of daily living on admission, patients found it difficult or impossible to get dressed or to put their shoes on (68.28% of patients), as well as to go shopping (55.17%), but after rehabilitation a significant improvement was achieved. Moderate difficulties were reported with household chores (56.55% of patients), and mild difficulties with maintaining personal hygiene (66.21%) and using public transport (64.83%).

Conclusion: Results of our study are in agreement with literature data. The reported pain is less intense, while activities of daily living are easier to perform.

Key words: hip arthroplasty; Oxford Hip Questionnaire; Activities of Daily Living

**THE WAY TO COMPLETE PSYCHOLOGICAL AND PHYSICAL RECOVERY AFTER
MULTIFRACTURAL INJURY OF CERVICAL PART OF VERTEBRAL COLUMN, OPERATIVE
TREATMENT AND REHABILITATION**

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Introduction: It is a fact that 5 - 10 % of people who have had a traffic accident or some fall, have serious injury of cervical spine. At that moment it's very important to prevent movement in that part. We do that through the immobilization. Then, when patient arrive at hospital the radiological evaluation, therapy for edema, immobilization and operative stabilization is necessary. Standard radiological treatment is made in 3 direction (profile, A-P, through the open mouth). In 30 % of cases it is C2 trauma, 50 % C7. MRI and CT are indicated when there is a possibility of spinal cord injury. That injury is worse because in most cases it causes permanent disability. For practical reasons there are 3 types of spinal injuries: Vertebral column injuries, spinal cord injuries, injuries of spinal ligaments. In most cases the combination of all three is present. FLEXION FRACTURE occurs when force acts in vertical direction, type and intensity of fracture depends of how force big is and in which position was the neck at the time of injury. There are 4 types of flexion fractures. LUXATION FRACTURE is when there is a totally luxation, separation of vertebral parts with ligament injury and spinal cord trauma. When vertebral fracture is combined with neurological trauma, the treatment shall be surgical. Surgical treatment should contain: placing bones in normal position, decompression of neurological parts and fracture stabilization.

Goal: We want to present the case report of patient who had serious injury of cervical spine with multivertebral fracture and spinal cord lesion and his several surgical treatments during medical rehabilitation.

Materials and methods: Lj. G, patient, 43 years old, hurted in a traffic accident in Bulgaria on 13. 01. 2013. In that country he was treated with traction, 5 days long and then he was transferred to the neurosurgical clinic. The precise diagnose is (Dg.): FRACTURA C2 /DENS/. FRACTURA CORPORIS VERTEBRAE C3 ET C4. FRACTURA C4, C5 LUXATIONEM. QUADRIPARESIS. The complex operation is done not long after that, OP (operation) 1: Preparatio vertebrae pars ventralis reg. C3 - C6. Extirpatio disci C4 - C5 et implantatio cage in i.v. spatii C4 - C5; OP2: Preparatio vertebrae pars dorsalis desarticulatio C4 - C5 bill.; OP3: Repositio luxationem C4 - C5 cum fixatio C3, C4, C5 et C6; and after 10 days OP4: Preparatio vertebrae pars dorsalis regio C2 - C7 et fixatio transarticularis C3, C4, C5 et C6. After successfully ended surgical treatment physical rehabilitation started.

Results: He was treated on Clinic for Physical medicine and rehabilitation in Nis, from 11. 2.- 18. 3. 2013. Final results were ability for walking and positioning in the bed, immobile neck. After that, medical treatment was continued in our medical institution. Special hospital of Ribarska Banja, for next three months. We will show you the improvement of functional status which we succeed through the: therapy with movement, hydrotherapy combined with movement and physical procedures.

Conclusions: Despite how spinal injury heavy and serious is, we proved that if we apply proper neurosurgical treatment, at proper time, consequences can be minimum.

Key words: Cervical fracture, quadriplegia

**REHABILITATION ASPECTS OF THE SURGICALLY AND CONSERVATIVELY TREATED
LOW BACK PAIN SYNDROME**

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Low back pain syndrome (LBPS), a disease of modern civilization, one of the most common entities from whom suffers every 10 persons in Serbia. LBPS is classified into primary and secondary, and as the duration of acute, subacute and chronic. The most common reasons for involvement of neurosurgeons in the treatment are: the existence of the intervertebral disc prolapse, lumbar spinal stenosis without signs of spinal instability, the existence of proven lumbar instability and tumor lumbar spinal canal. There is a perception that in the diagnosis and treatment of LBPS there are a large number of unnecessary medical procedures. In recent years, in the developed countries the plateau social and financial implications of LBPS is observed, which is explained using a guide based on well-documented evidence (EBM) with recommendations for diagnosis, treatment and rehabilitation. LBPS is a medical model of disease which diagnose is based on a good "triage" patients, which will allocate 2 % of patients with serious spinal pathology "red flag". Diagnosis of nonspecific mechanical LBPS raises a history and physical examination (finding antalgic scoliosis has a level of evidence C, Lazarevic's sign of the level of evidence B). Routine laboratory tests are not advised. Changes discovered methods of visualization are important only if they correspond to clinical findings. EMG is not necessary if radiculopathy is clearly clinically diagnosed. According to EBM NSAIDs are effective in the symptomatic treatment of patients with acute LBPS, COX -2 inhibitors may have short term benefits on gastrointestinal function. There is strong evidence of the effectiveness of Paracetamol. For the LBPS is not recommended for routine treatment with corticosteroids. Muscle relaxants are justified by strong muscle spasms. Antidepressants can be given as adjuvant therapy depressed patients. Early rehabilitation after the operation begins immediately dosed and intensive after 3-4 weeks in stationary conditions. According to EBM inaction is not recommended in patients with normal LBPS without neurological disorders. Spinal manipulation may be useful for facet joint subluxation. There are no reliable data on the effectiveness of lumbar support belts. It is recommended that the application of ice, and the use of tens, galvanic, interferential and diadinamic current in acute LBS for most agents, there is no solid evidence of efficiency. Most of the guide shows that exercise are not effective in the treatment of acute LBS in the first two weeks of the disease. In subacute rehabilitation LBPS application is encouraged thermal procedures, electromagnetic fields, lasers, including electrotherapy stimulation paretic muscles. Some exercise program leads to pain reduction and functional improvement. The rehabilitation of chronic LBS should vigorously apply hot packs, ice and hand massage. No proof that US has the influence of pain reduction, and studies the effectiveness of TENS show contradictory results. No evidence of favorable effects of acupuncture and lumbar corsets and belts. Intense and long-lasting therapeutic exercises and all forms of hydrotherapy have proven positive effects. The most important recommendations relate to the importance of primary and secondary prevention and elimination of risk factors that may prevent the occurrence and recurrence of LBPS.

**COMPARATIVE RESULTS OF DISCOGENIC RADICULOPATHY TREATMENT BY
PHYSICAL / OPERATIVE MANAGEMENT,
ILLUSTRATING THE DEGREE OF RECOVERY USING QUEBEC DISABILITY SCALE**

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Introduction/objective: The disc herniaion, prolapse, protrusion, extrusion of nucleus of pulp often compress the corresponding peripheral nerve roots, thus creating a typical picture of radiculopathy. Treatment of these conditions may be conservative or surgically. The surgically treatment is the only choice in the case of absolute indications. In the case of the relative indications for surgical treatment, with the physical treatment could be achieved good recovery.

The aim of the work: To evaluate treatment results of Compressive Radiculopathy Discogena with relative indication for surgical treatment and check up the results of treatment of the same lesions achieved with physical treatment. Finally, we compare the achieved results and determine which of the two treatments leads to better recovery.

Study participants and methodology: The study included 100 patients who had a relative indication for surgical treatment. They were divided into two groups – those who were treated with physical treatment and those who were treated surgically. The degree of recovery after the treatment is verified by Quebec low back pain disability scale.

The research results were statistically analyzed and were compared according the statistical standards. The results are presented in tabular and graphic form with the legends and text explaining the individual obtained values and variables.

Conclusion: There are no highly significant differences in the degree of recovery of patients after both of treatments physical and surgically. We have the right to conclude according to our research demonstrated that the physical treatment should be first choice in treating such patients.

Key words: compressive radiculopathy, surgical treatment, physical therapy, Quebec scale

**COMPARISON OF LASER THERAPY WITH PULSED ELECTROMAGNETIC FIELD
THERAPY FOR PAIN RELIEF IN PATIENTS WITH CHRONIC LOW BACK PAIN**

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Low back pain (LBP) is one of the most common medical and social problems. Although pharmacologic analgesic therapies may be effective for patients with acute LBP, they are unsatisfactory for many patients. The use of pharmacologic therapy can interfere with physical activity and produce side effects (1). These concerns have increased interest nonpharmacologic therapies for LBP.

Aim: The study was carried out to evaluate and compare the effect of low frequency pulsed electromagnetic field (PEMF)(2,3) and low power laser therapy (LLLT)(4)

Methods: The 31 patients LBP based on clinical findings were included and randomly assigned to treatment with laser or PEMF. 16 patients was treated with PEMF - frequency 25 Hz, power 6mT 15 min every day 3 weeks (except weekend) /15 treatment in all. 15 patients received the laser treatment - IC laser wavelength 780nm const., power output 10mW, 1-2J/cm² per points, 6 points of skin overlying L4,L5 and S1 radix bilateral 3 weeks (except weekend) /15 treatment in all.

Results: Evaluate the effects of laser and PEMF sessions on pain relief, in the post - therapy period compared to pre - therapy period in both groups was observed statistically significant improvement in respect to all parameters: VAS 0 - 100 peak pain, patients degree of impairment-zero to four points were awarded for the following responses:no impairment 0, mild 1, moderate 2, limited 3 and severity limited 4 and improvement by physical examination - Schober test - Lumbar Range of Motion). Pain level and degree of physical improvement were scored and analyzed by related t-test and unrelated t-test. Differences were considered statistically significant at $p < 0,05$.

Conclusion: No systematic or local side effects were reported during or after the treatment period. This study revealed that application of LLLT and PEMF is equally effective and safe method in pain relief and function in patients with LBP.

THE EFFECT OF MOBILIZATION TECHNIQUE FOR STRETCHING IN PATIENTS WITH CHRONIC CERVICAL SYNDROME

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Introduction: Chronic cervical syndrome is associated with pain, disability and quality of life of patients. The goal of this research is the objective evaluation of the therapeutic effect of mobilization techniques for stretching (MTS), in comparison with medicamentous therapy and classic physical procedures, in treating of patients with chronic cervical syndrome.

Materials and methods: This study was made as experimental, randomized, controlled clinical trial, opened type. The examination included 60 patients (45 females and 15 males), with chronic cervical syndrome. All patients were divided in three groups. The first, control group of 20 persons, composed of patients treated with medicamentous therapy (Meloksikam of 15 mg, 1 tablet per day). The second group consisted of 20 patients treated with MTS and the third group consisted of 20 patients treated by classic physical procedures (manual massage and therapeutic exercises). All procedures were implemented during 10 days. As observing parameter was used: Lattinen test for the evaluation of the pain sensitivity and the range of motion in cervical spine, before and after therapy. For the statistical analysis of the acquired data, was used Student's t-test.

Results: After therapy the pain was considerably reduced or disappeared in each group, cervical mobility was increased, but these effects were the most significant in the II group of the examinees, treated by MTS ($p < 0,001$), than the effects in other groups of patients: I group ($p < 0,05$) and the III group ($p < 0,01$).

Conclusions: According to the results of this study it can be concluded that using mobilization techniques for stretching is very effective therapeutic procedure in treatment of patients with chronic cervical syndrome.

Key words: cervical syndrome, mobilization techniques, stretching

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SPECIALIST REHABILITATION SERVICE

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Introduction: A ground breaking and innovative complex rehabilitation pathway has been developed in Cheshire and Merseyside, UK to cover a population size of 2.4 million with an additional investment of £10 million. The design of this pathway is the result of partnership working between commissioners, Hospital Trusts, Social Care to ensure improved clinical outcomes for patients with highly complex rehabilitation needs following a sudden and traumatic illness or injury.

Methods: NHS Cheshire and Merseyside, England set out a vision for a rehabilitation consultant led pathway for complex rehabilitation that is regionally planned and locally responsive. Over the last twelve months, rehabilitation services have undergone a major restructure across Cheshire and Merseyside. As a result, the Rehabilitation Network includes a co-ordinated pathway for Hyper Acute, Acute and Sub-Acute bed based units, extended rehabilitation and specialist community and outpatient services to realize the benefit of quality improvements. Key drivers and principles for change were identified, including eliminating fragmented care and gaps in service provision, high-quality services and a requirement for timely and appropriate access to rehabilitation professionals.

Results: The issues identified in relation to the delivery of services for complex rehabilitation formed the basis of service and quality improvement. Strong, credible clinical leadership from all health and social care professionals has enabled implementation of the re-designed pathway. A Rehabilitation Network single point of access screens all referrals and works in partnership with the Rehabilitation Consultants to ensure timely and appropriate placement according to rehabilitation need. Rehabilitation Co-ordinator based within each Unit fulfils a unique role by providing the voice of the patient and family, engaging with the Rehabilitation Consultant and multi-disciplinary team, and ensuring that best practice clinical models of care based on the BSRM guidance (2010) are adopted. Initial findings after six-months of implementation is showing improved clinical outcomes, reduced lengths of stay within the pathway, improved patient and family support and better partnership working. Further details will be provided within the poster.

Conclusion: The process of strategy development of the rehabilitation pathway across Cheshire and Merseyside has provided an opportunity for a comprehensive rehabilitation service model review. Initial developments within the Rehabilitation Network are seen as the start of an evolutionary process of service model change that will be reviewed and monitored.

Key words: Clinical leadership, rehabilitation co-ordinator, partnership working, rehabilitation pathway

**TRAINING NURSES ON BED POSITIONING AND TRANSFERS OF PATIENTS IN A
REHABILITATION CENTER**

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Introduction: Rehabilitation services need to improve in quality to maintain patients in optimum condition. Euromedica Arogi Thessaloniki is a newly founded (10/2010) rehabilitation center with 220 beds capacity. It offers services to orthopaedic, CVA, TBI, SCI, and MS patients and there is a great variety of severity and clinical presentation of patients. One of the highest priorities is the continuous training program of our healthcare professionals. For that reason our Center organized training programs for the nurses on bed positioning and transfers of patients.

Material and Methods. The center has 90 nurses with 10 paramedics, 48 PT, 5 OT, 5 SLT, and 14 hydrotherapists. The training program was created for nurses and paramedics. The training sessions were planned according to the following plan:

1. Specified Subjects

A. 1st Cycle: Patient Transfers

B. 2nd Cycle: Positioning patients in bed, position-changes per patient category

2. 90 nurses and 10 paramedics were divided into groups of 5 people (20 teams in total)

3. Two training groups were scheduled per day and every training session lasted for 3 hours (6 hours per day in total)

4. The training sessions for both thematic cycles is equivalent to 20 working days, commencing on 19/03/2013 until 16/04/2013, equivalent to a total of 120 hours.

5. The trainers were the heads of the physiotherapy.

The training program was planned as follows:

- During the first half hour, the trainer made reference to the theoretical part of the thematic cycle
- Thereafter, each trainee performed the procedure on certain patients per category, from the department to which he belongs

Results: Our staff completed the training in the anticipated timetable. The prevalence of musculoskeletal disorders in nurses and paramedics were reduced by 24,7% in all the wards.

Conclusions: Quality of rehabilitation services is connected with continuous training. The ultimate goal of the training program is skilled nursing care and reduced rate of occupational hazards to promote efficiency in patient care.

Key words: Bed positioning, transfers, education, occupational hazards

ON SOME FORGOTTEN HEROES OF REHABILITATION MEDICINE

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"Simple ideas lie within the reach only of complex minds." Remy de Gourmont, 1858 - 1915, was a French Symbolist poet, novelist, and influential critic: was stricken with lupus vulgaris. Disfigured by this illness, he largely retired from public view; he began to suffer from loco-motor ataxia and be increasingly unable to walk.

Reviewing introductory chapters and articles on the history of Rehabilitation medicine, reveal the fact that many physicians, allied health professionals, artists or authors, who contributed to the academic and public awareness of the disabled people, are not included in the "formal" history of our profession. The writer Robert Graves (1895-1985) invented the term *Apoplepsia* (turning the head away): himself victim of Shell Shock in the First World War trenches was aware of the public general ignorance of people with disabilities. His most famous book "I, Claudius", dealt with a severely disable emperor...

To mention few examples: Vincenz Priessnitz (1799–1851) who founded the first hydrotherapy institute in the world in Gräfenberg in 1822 - Priessnitz had a God - given gift as a physician, he had intuition, extraordinary observation skills and memory, and, moreover, he introduced his ideas at the right time and in the right place. Johann Schroth 1798 –1856, Johann Friedrich von Hessel; Friedrich Mommsen (1885-1976), Konrad Biesalski (1868-1930), Wilhelm Würtz (1875-1958) and the Berlin's Oskar-und-Helene-Heim, pioneers of orthopedic and rehabilitation institution for the disabled children and many other forgotten heroes.

CAN MAGNETIC RESONANCE IMAGING FINDINGS PREDICT TREATMENT OUTCOME IN ADHESIVE CAPSULITIS: A PROSPECTIVE STUDY?

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Introduction: Adhesive capsulitis is characterised by spontaneous onset shoulder pain and subsequent restriction of active and passive glenohumeral joint motions. The onset is mostly insidious and of idiopathic in origin. Temporal course of the disease may be very long and may affect quality of life and work ability. Although adhesive capsulitis is a clinical diagnosis, magnetic resonance imaging (MRI) can be used in order to identify etiological factors, differential diagnosis and treatment planning. The aims of treatment in adhesive capsulitis are, reducing or allevating pain and improving joint functions. The purpose of this study was to investigate the predictive value of MRI findings in treatment outcome of adhesive capsulitis patients.

Materials and methods: A total of 30 patients with a clinical diagnose of adhesive capsulitis were included in the study. All the patients were evaluated with MRI prior to 15 day physical therapy programme which consisted of physical therapy modalities, range of motion exercises and stretching exercises. Soft tissue signal changes at the rotator interval level, thickening and increased intensity in the inferior glenohumeral ligament as a reflection of the axillary recess were considered as positive findings supporting adhesive capsulitis on MRI. All the patients' range of motion (ROM), visual analogue scale (VAS), health assessment questionnaire (HAQ), and quick-disabilities of the arm, shoulder and hand (Q-DASH) scores were recorded before and at the end of the treatment programme.

Results: Out of 30 patients, 9 patients had MRI findings consistent with adhesive capsulitis while 21 patients had no MRI findings. There was significant improvement in all patients in terms of ROM, VAS, HAQ and Q-DASH scores after treatment. However there was no significant difference between patients with and without MRI findings in both pre-treatment and post-treatment evaluations.

Conclusion: This study revealed that existence of specific MRI findings in adhesive capsulitis do not affect treatment outcome and have no prognostic importance. However MRI is important in exclusion of other shoulder pathologies in the differential diagnosis of adhesive capsulitis.

Keywords: Adhesive capsulitis, magnetic resonance imaging, physical therapy

ENABLING THE DISABLED THROUGH TECHNOLOGY

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Introduction: North West Assistive Technology (NWAT) serves a population of 6.6 million people across Cheshire, Merseyside, Greater Manchester, Lancashire and South Cumbria in the United Kingdom. The service was established in 1995 to provide specialist assistive technological aids to support patients with severe disability across all age groups. NWAT has a large multi-disciplinary team that consists of: Consultant in Rehabilitation, Service Lead, Speech and Language Therapist, Occupational Therapist, Business Manager, Deputy Rehabilitation Engineering Manager, team of Rehabilitation Engineers and Environmental Control Co-ordinators.

The aim and the vision of the service are to promote independence, through the provision of assistive technology to meet the needs of all clients in an inclusive and holistic manner. This will facilitate control of their environment both at home and in a Hospital setting.

Materials and methods: NWAT reviewed data base activity over the twelve month period 2012 -2013, particularly analysing the number of patients who benefitted from the service, the cause of their disability, the most common diagnosis of new referrals, the various types of technologies we provided and the associated benefit for the patient group.

Results: In the twelve month period NWAT received approximately 400 new referrals for both assistive technology and communication devices, and has a current patient group of 1200, who have various diseases and disabilities. Analysis showed that the most common conditions were: Multiple Sclerosis, Spinal and Brain injuries and Amyotrophic Lateral Sclerosis. NWAT provided a range of assistive technology which included environmental control systems, specialist computer access and specialist communication devices.

Patient and family feedback highlighted that the service is very successful in: Promoting patient independence and autonomy, managing and reducing potential risk, facilitating socialisation and inclusion, reducing stress and frustration levels on both patients and cares and greatly improving quality of life.

Conclusions:

- The service helps to improve quality of life and independence to disabled people across all age groups
- NWAT believes that the service will continue to ease the pressures on statutory health and social services providers by enabling individuals to remain in their own homes with increased independence, which is especially relevant in today's economic climate

Key words: Assistive Technology, environmental control, computer access, communication aids, disability

ADVANTAGES OF COMBINED PHYSIOTHERAPY AND BALNEOTHERAPY TREATMENT OF PATIENTS WITH ANKYLOSING SPONDYLITIS

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Introduction: Ankylosing Spondylitis (AS) is a chronic inflammatory disease, characterized by limitation of the spinal and thoracic mobility, structural damage, pain and stiffness, ankylosis, leading to impaired daily activities and reduced respiratory capacity.

Objective: To compare the results of treatment with combined physiotherapy and balneotherapy and treatment with physiotherapy alone, in patients with AS.

Materials and Methods: Participants were patients diagnosed with AS, referred to "Mlječanica" during the two years period (Apr 2011 till Apr 2013.). The patients were randomly divided into two groups: A (n=22) treated with standard physiotherapy in combination with balneotherapy, and B (n=17) treated with standard physiotherapy alone.

Inclusion criteria were: diagnosis of AS, based on the Modified New York Criteria (van den Linden et al. 1984) and duration of the disease less than 20 years.

Exclusion criteria: Morbus Reiter, psoriasis (groups A and B) and known contraindications for use of balneotherapy (group A).

The outcome was evaluated by Bath Ankylosing Spondylitis Functional Index (BASFI), VAS for assessment of pain and stiffness (the score range from 0 to 10), Modified Schober test for spinal mobility, measurement of chest expansion and occiput - to wall distance (WHO / ILAR recommendations, van der Heijde et al, 1999). All assessments were done at admission and at discharge, by two PT. Results were presented as median with minimum-maximum values. Statistical analysis was carried out using the Statistical Package SPSS, Inc.2006. A value of <0.05 was considered significant.

Results: Both groups were homogenous regarding the gender, age and duration of disease (all male, median age 38.5; range 20-63). The median disease duration was 9 (2-19) years. At discharge the functional results were slightly better in group B, without statistical significance ($p=NS$). The spinal mobility measurements showed significant increase in group B ($p<0.05$). Pain and stiffness decreased significantly in both groups, but in group A at higher significance ($p<0.01$).

Conclusion: Combination of standard physiotherapy and balneotherapy leads to significantly better results in improvement of spinal mobility and pain of patients with Ankylosing Spondylitis.

Key words: ankylosing spondylitis, physiotherapy, balneotherapy

**CO-RELATION AND INTERACTIVITY BETWEEN DAILY LIVING BEHAVIOR AND
OSTEOARTHRITIS KNEE PAIN LEVEL AT ELDERLY PATIENTS**

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Introduction & aim: Osteoarthritis is the most common disease of joints in adults around the world. Clinically significant osteoarthritis of the knee is found at approx. 10 % of the adult population. The frequency of knee osteoarthritis continues to accelerate with whole endogenous and exogenous risk factors for osteoarthritis, like age, but especially because of the increasing of obesity in population in the age over 60 years. Grotle et al. found a significant dose-effect relationship for overweight (BMI >30) as a risk factor for knee osteoarthritis. In the men population aged 60 to 64 osteoarthritis is more commonly found in the right knee (23%) than in the left knee (16.3%), while its distribution seems to be more evenly balanced in women (right knee, 24.2%; left knee, 24.7%). Patients suffering from osteoarthritis often complain of pain on movement, typically occurring when movement is initiated or when the patient begins to walk. The pain is often described as a dull ache. As osteoarthritis progresses, the pain becomes continuous, and the functionality of the joint is severely impaired.

Materials and methods: We have attended patients with clinically significant osteoarthritis of the knee. These patients have been treated in clinic for physical medicine and rehabilitation during 2012 to 2013. All of them have been under strictly controlled obesity treatments for some period during past 5 years. Parameters which have been controlled are as follows: age and sex, pain (visual pain scale – VAS), range of movement / walking, activities of daily living measure (Lequesne index), BMI index and weight changes (losing). Measuring check-points: before therapy and physiotherapy for knee osteoarthritis and after 3 month. Results are evaluated and interpreted statistically.

Results: Initial data: patients observed: 40 patients; ages: between 63 and 74 years; sex: 22 women and 18 men; two groups: group I (BMI 25-30), group II (BMI over 30); lost weight goals (fulfilled): - 5 kg; treatments applied: exercise therapy, stretching/walking, magnetic therapy and electroanalgesic pain management.

Three month later (after the beginning of treatments): range of movement improved for average 18%; Lequesne index improved in group I (BMI 25-30) average 19%; Lequesne index improved in group II (BMI over 30) average 14%.

Conclusions: In this study we have followed 40 patients with knee osteoarthritis, with BMI from 25 - 30 in first and BMI more than 30 in second group. After this study we can conclude: elderly persons' losing 5 kg weight and making regular exercise plus physical therapy knee OA would decrease (by Lequesne index) in average 16% in the group with initial BMI 26-30 and 12% in the group with initial BMI 30 and more. Lowering BMI leads towards less suffering of osteoarthritis (by Lequesne index). This mean that interactivity between

Key words: knee osteoarthritis, obesity, physical therapy

UNIPOLAR AND BIPOLAR PROSTHESIS IN PATIENTS WITH FEMORAL NECK FRACTURES – IS THERE ANY DIFFERENCES?

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Introduction: The treatment of choice for the femoral neck fractures in elderly people is hemiarthroplasty. There are two common types of partial prosthesis: unipolar and bipolar. The aim: To estimate if there is any difference between two types of prosthesis in functional outcome.

Methods: We followed 50 patients with monopolar (Austin Moor type) and 50 patients who underwent bipolar (Duo-Kopf) hemiarthroplasty. We used FSQ (Functional Status Questionnaire), VAS and Harris Hip Score to evaluate functional outcome one and five years after surgical procedures. The data were analysed by SPSS packet, using methods of descriptive and analytical statistics.

Results: The results show that there is no significant difference in functional outcome one year after surgical procedures ($p=0,210$), but there is significant difference after 5 years, the patients with monopolar prosthesis showed significant lower grade of functional outcome ($p=0,004$). The control x-rays show significant degenerative changes in the patients with monopolar prosthesis.

Conclusion: Our results show that short term outcome is satisfied for both groups. Regarding age of the patients, it is very important to allow patients early mobilisation, regardless of type of prosthesis. Longterm results showed better outcome in patients with bipolar prosthesis. As the matter of fact, monopolar prosthesis are used nowadays very rarely, but regarding low income of some countries, monopolar prosthesis could be used frequently.

Key words: hip fracture, functional outcome

**REHABILITATION OF PATIENT WITH PERCUTANEOUS VERTEBROPLASTY AFTER
OSTEOPOROSIS FRACTURE OF SPINE - CASE REPORT**

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Introduction: One of the many common complications of osteoporosis, represents compression fractured vertebrae of the thoracic and lumbar spine. The treatment is complex. Besides proper nutrition, medications, application of appropriate orthopedic devices - orthoses, surgery with percutaneous method of vertebroplasty, a patients choice of treatment is physical procedures and kinesiotherapy.

Purpose: To display the physical therapy and rehabilitation for patients with percutaneous vertebroplasty in thoracic and lumbar part of the spine.

Materials and Methods: The patient is a woman aged 56 years, diagnosed with compressive fractures on seven, eight and nine thoracic vertebra and second lumbar vertebra as a result of postmenopausal osteoporosis. One month after percutaneous vertebroplasty, the patient complains of pain yet along the thoracic part of the spine that is distributed, including the ribs and pain in all joints, weakness in the arms and legs. The patient was treated with physical procedures, transcutaneous electrical nerve stimulation, interferin currents, ultrasound sonography and kinesiotherapy in the Department of Physical Medicine and Rehabilitation in Skopje, Macedonia. The duration of the procedure was one month. Parameters for monitoring were extent of mobility of the spine and extremities and Visual analog scale (VAS) for pain.

Results: After the rehabilitation treatment, the reduced pain by VAS is 50%, ROM of the cervical part of the spine is increased to 20% flexion, to 15% extension, 10% the right and left lateroflexion and 15% of rotation. ROM of the lumbar spine is increased to 20% of flexion, 5% of extension, 10% of lateroflexion, and rotation of 5%.

Conclusion: Physical medicine and rehabilitation plays an important role after making the percutaneous vertebroplasty on the spine with osteoporotic fractures. The contribution is significant on the improvement and maintenance of function paravertebral musculature and musculature of the locomotor system, thus reducing pain. Time and teamwork with patients with vertebroplasty provides quality recovery.

Keywords: osteoporosis, compressive fractures, vertebroplasty, rehabilitation

NORTON SCALE USED FOR PREDICTING REHABILITATION OUTCOME IN THE ELDERLY: A SYSTEMATIC REVIEW

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Introduction: Norton scale is usually used for assessing pressure ulcer risk. Recent studies show that except for assessing pressure ulcer risk, Norton scale may be used for predicting rehabilitation outcome in the elderly. To the best of our knowledge, these studies have never been systematically reviewed until now.

Materials and Methods: A literature search was conducted for all studies concerning Norton scale being used for predicting rehabilitation outcome in the elderly. The current knowledge concerning this unique association is presented here.

Results: Norton scale scores are negatively associated with complications other than pressure ulcers during rehabilitation, prolonged rehabilitation, poor rehabilitation immediate outcome, falls more than a year following rehabilitation, and mortality more than a year following rehabilitation in elderly patients with hip arthroplasty, stroke, and hospital - associated deconditioning.

Conclusions: Norton scale may be used for predicting short - term and long - term rehabilitation outcome in the elderly. We believe that Norton scale may be an ideal tool for predicting rehabilitation outcome in the elderly since it is easy – to - learn, easy – to - use, and not time consuming. But most importantly, it is already being used successfully, so implementation should be simple.

Key words: elderly, Norton scale, rehabilitation

MENTAL IMAGERY FOR THE MANAGEMENT OF PHANTOM LIMB IN LOWER LIMB AMPUTEES: OUR EXPERIENCE

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Introduction: The better understanding of the brain's role in phantom limb has opened the way to new treatments and some promising new therapies are on the horizon, like the Mental Imagery. Phantom limb (PL) is a complex phenomenon that includes a wide variety of symptoms: pain, paresthesias, abnormal movements or uncomfortable positions, referred to the absent limb. It obviously interferes with the patient's quality of life. After the loss of afferent signals the primary somatosensory cortex undergoes substantial reorganization: the areas that are near to the one that controlled the amputated limb will take over this cortical region that no longer receives input. This maladaptive plasticity partly explains some instances in which afferent nociceptive stimulation of neurons within the stump or surrounding areas can produce sensations in the missing limb (Bolognini, 2013). Mental Imagery is a simple technique in which the neuromatrix became tricked by the patient's imagined movements of the PL and the cortical reorganization decreases (MacIver, 2008).

The aim of our study is to test the efficacy of Mental Imagery in reducing the phenomenon of the PL in lower monolateral amputees.

Materials and methods: Amputees affected by lower limb amputation and PL, were enrolled in the study and randomly divided in two groups. All subjects received the same daily standard pre-prosthetic and prosthetic program. The experimental group participated in the Mental Imagery training program 2 times a week for 4 weeks, while the control group had the same number of extra sessions of standard exercises. This new technique aims at treating the PL as a real part of the body. Following the physiotherapist's advices the patient had to realize mental movements of the PL.

Each session was individual and consisted in 15 "phantom's movements", as described by Ulger in 1998, after relaxation exercises. A comfortable and quiet therapeutic setting was reserved.

Specific assessment's scales were used to evaluate phantom pain and painful phantom sensation: the second group of questions of the Prosthetic Evaluation Questionnaire related to PL and the Brief Pain Inventory.

Results: The evaluated phantom phenomena have shown a trend to decrease more in the experimental group than in the control group. No full statistical analysis was done because of the few amputees enrolled (n 25). In particular the intensity and the frequency of PL sensation decreased by 25% and 12% respectively; the intensity and the duration of the PL pain were reduced by 23% and 13% respectively.

Conclusions: Mental Imagery could represent a helpful tool to decrease the PL pain and/or sensation by creating a normal return signal to the neuromatrix. It is a simple, safe and inexpensive therapeutic exercise that can be done by the patient himself, after a proper instruction of the technique. No device is needed for the practice and it has no contraindications.

Key words: Phantom limb, amputee, mental imagery, pain, sensation, neuromatrix

PHYSIATRIST EXPERIENCE IN THE REHABILITATION OF INPATIENT PSYCHIATRIC PATIENTS

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Introduction: From January 2013. at the departments of Psychiatry Clinic, as a part of a team in the treatment of psychiatric patients, physiatrist and physiotherapist were included. Earlier consultant working principle was offered only to the patients with movement difficulties, where rehabilitation is conducted in order to prevent immobility syndrome. The new approach requires a continuous presence of physiatrist in medical rounds, with team planning rehabilitation for all patients that are considered necessary. We found that a significant number of patients, that needed rehabilitation treatment without a delay, were with associated orthopedic, surgical and neurological comorbidities. During those 6 months, we have had 46 patients: five orthopedic, where we performed physical training program and applied electromagnetic field, laser, TENS; two oncology patients after partial mastectomy which we rehabilitated in order to prevent contracture of shoulder joint and occurrence of lymph edema and two patients with multiple sclerosis that had depressive disorder. In our program, patients with cervical and low back pain were included (those syndromes are common in patients who are alcoholics). New experience was group of 12 patients with rigor, posture disorder, bradykinesia, impaired walking, with expressed extrapyramidal syndrome, as a side effect of a certain group of neuroleptics. Our program consists of breathing exercises, stretching, balance and coordination exercises to correct posture and walk. Before this, our work at the Psychiatry Clinic has been at the consultation service level and at the same period last year, only 5 patients have been included in rehabilitation program. Something that is new in our work as well as in the World is dance therapy and our therapist is trained in such way. In this therapy were included 2 patients with expressed parkinsonism. Our future goals and plans are to prove the effectiveness of rehabilitation measures at extrapyramidal and metabolic syndrome, resulting from application of certain group of neuroleptics and to include as much psychiatric patients in rehabilitation. They are going to be monitored through tests (time up and go test, spatial orientation test) and studies.

Conclusion: physiatrist and physiotherapist included in a team dealing with the treatment of psychiatric inpatients, have an important role in their rehabilitation, complex perception of their situation and their preparation for the continuation of life in everyday surrounding.

TIMING AND FREQUENCY OF PARKINSON'S DISEASE (PD) SCREENING IN DETECTION OF A PREDICTABLE COURSE IN PREMOTOR PD

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There is an emerging consensus on the features that makes up premotor PD (Parkinson's disease) and greater evidence on the performance of several diagnostic tools for PD.

Parkinson's disease at risk syndrome (PARS), describes premotor PD, and its development into 4 stages, leading up to the manifest PD. The stages, for patients who do not yet have clinical PD, are defined as: prephysiologic, preclinic, premotor and prediagnostic.

PD patients have lower cerebrospinal fluid (CSF) α -synuclein levels, loss of DJ-1 function as a cause of autosomal recessive parkinsonism and low levels of DJ-1 in the CSF of patients with typical "sporadic" PD. LRRK2 mutations cause autosomal dominant parkinsonism. Parkin and PINK1 can help into how protein alterations cause neurodegeneration and how to quantitatively assess these changes as potential biomarker of PD. But screening, in select populations, might become appropriate if better understanding of the penetrance and predictability of a positive test is achieved.

PET and SPECT ligands may detect early abnormalities in presynaptic nigrostriatal terminal function. The rate of dopamine transporter (DAT) binding loss and Fluorodopa F18 reduction is 4 - 13% annually in early PD, correlates with the severity and the symmetry of motor scores in early PD.

The latency period from disease is not known, and it is likely quite variable. Clinicopathologic studies suggest that the pathologic process in the CNS begins 4 -7 years prior to onset of classic motor symptoms.

Neuroimaging changes may also occur in the early phase of PD. Hyperechogenicity of the substantia nigra (SN) occurs in a high percentage of PD patients and may be a risk marker of PD. Recent MRI techniques may detect the earliest changes of PD and reported increased diffusivity in the area of the olfactory bulb and olfactory tract using diffusion tensor imaging. Their validity is established only to patients with phase 3 disease.

The assessment of sympathetic innervation of the heart using MIBG SPECT scanning is another currently available approach. In early PD reduced cardiac uptake of MIBG is reported.

In subjects with lower smell identification scores and bowel movements frequency earlier in life there is a higher incidence of PD and asymptomatic α -synuclein pathology. PD has been noted to emerge a mean of 12.7 years after the diagnosis of REM sleep behavior disorders (RBD). The identification of numerous gene mutations related to PD is indicative of a disease process that begins long before neurologic symptoms emerge.

The 2 strongest risk factors for PD are a family member with genetic mutation and a diagnosis of idiopathic rapid eye movement behavior disorder (RBD). The risk of PD in a LRRK2 is approximately 20 times higher than in a noncarrier. Lifestyle risk factors as not smoking and drinking fewer caffeinated beverages may produce significant modification of the risk of PD. Less midlife adiposity and fewer bowel movements, greater calcium consumption and exposure to pesticides may also increase the risk of PD.

Two - stage screening, where the first test is relatively inexpensive but sensitive and moderately specific, reduces the number of expensive confirmatory tests. Using imaging as the second test reduces costs by lowering the number of scans needed. The first-stage test must be at least as

sensitive as imaging, to have a high overall accuracy rate.

Olfactory testing is moderately sensitive for PD. Findings suggest that they are not sufficient by itself to screen for PD, but they may be combined with a more sensitive test to detect premotor PD.

Neuropathological staging system by Braak and coll., allows predictable evolution of pathology. Understanding the order of onset of clinical and observable physiological features could guide screening strategies for premotor PD.

For implementation PD screening, it is important to understand the time line of emergence of nonmotor clinical features of PD and the timing of the onset of dopaminergic abnormalities in the striatum. The frequency of screening for at-risk individuals depends on the time course of the evolution of synuclein pathology. Many nonmotor features are relatively nonspecific, particularly in the elderly.

In the future first ongoing research goal will be to provide the tools that can determine when nonmotor symptoms are PD-related or not. Second long-term goal of the research will be to design clinical trials to test treatments that might prevent or delay the onset of motor features of clinical PD.

TREE FALLING AND SPINAL CORD INJURY: CASE SERIE

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Introduction: Falling is a common cause of spinal cord injury (SCI) and can cause permanent disability. This paper aims to characterize the population admitted to a Center of Rehabilitation Medicine, with SCI, after falling from a tree, in the last three years. The papers on this topic are scarce, so it may be a contribution to a better scientific knowledge in this area.

Materials and methods: Sample includes patients with SCI caused by falling of a tree and discharged from a Center of Rehabilitation Medicine, between 2010 and 2012. We collected demographic data, type of tree, level of injury, AIS classification, Functional Independence Measure (FIM), Spinal Cord Independence Measure (SCIM) and destination after discharge. Values of "FIM gain" and "SCIM gain" were calculated. Data were analyzed using SPSS ® for Windows ®.

Results: We considered a sample of 16 patients, of whom 75% were male. The mean age was 58.19 years (min: 24, max: 81). Regarding education and occupation, 93.8% had only primary education and 1 patient (6.3%) had studied up to 9th grade. The most common occupation was manual/rural labor (75%) and of these, only 2 patients were loggers. The remaining 25% were retired. The average hospital stay was 131.06 days (min: 24, max: 305). Regarding the level of injury, 18.8% were high quadriplegic, 18.8% were low quadriplegic, 43.8% were dorsal paraplegics and 18.8% were lumbar paraplegics; 37.5% had complete injury and 62.5% had incomplete injury. The tree from which there were more falls was the olive tree (37.5%); 12.5% fell of a pine; 12.5% of a peach tree; 6.3% of a walnut; 6.3% of a cherry tree; in 25% of cases the type of tree was unknown. The month of the year in which there were more falls was November (37.5%). February accounted for 18.8%. Other months accounted for approximately 6%. These differences are significant, with a higher prevalence of falls from olive tree, in November, probably related to the olive harvest. There is a significant difference between age and the fact that the injury is complete or incomplete (the elderly have incomplete lesions, $p = 0.031$) and there is no significant correlation between age and level of injury. No other correlation was found. This may be due to the small sample. Note that 87.5% of patients returned home after discharge.

Conclusion: The average age of the sample is close to 60 years. The elderly represent a group of risk. Factors such as a narrow channel, a column with low flexibility and reduced dexterity and neuromotor coordination contributes to the risk of SCI. To emphasize the danger of olive picking, often made without security measures, and represents 37.5% of falls. Falling of a tree is a preventable cause of SCI and its incidence can be reduced. Awareness campaigns are needed, especially in rural areas, to inform the public and promote the adoption of security measures when carrying out activities involving climbing trees.

Keywords: Spinal cord injury, fall, tree

TRAINING NURSES AND THERAPEUTIC STAFF IN THE USE OF FIM IN REHABILITATION PATIENTS

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Introduction: Rehabilitation services need to improve in quality to maintain patients in optimum condition. Euromedica Arogi Thessaloniki is a newly founded (10/2010) rehabilitation center with 220 beds capacity. It offers services to orthopedic, CVA, TBI, SCI, and MS patients and there is a great variety in severity and clinical presentation of patients. It is important for the staff of a rehabilitation center to focus on the functional goals of the patients and encourage them to fulfill them. For that reason our Center organized training programs for nurses and therapeutic personnel for the proper use of FIM.

Material and Methods. The training sessions were planned according to the following plan:

The training sessions took place in 5 patient wards and the Intensive Care Unit of Euromedica - Arogi Rehabilitation center. Ninety nurses 48 physiotherapists, 14 hydrotherapists,, 5 speech and language therapists and 10 paramedics were divided into teams of 6 people (28 teams in total) The daily training session involved one team and lasted for 4 hours (the first hour involved an introduction to the theoretical part and the last 3 hours involved practical training). Each training session equals in 20 working days, commencing on 03/06/2013 until 30/06/2013 (120 hours total).The training is divided into two phases.

FIRST PHASE: The physiatrists and occupational therapists had the role of the trainer and the trainees were the heads of the physiotherapy and nursing department. During the first hour the trainer made a theoretical introduction of the specified subject. In the 2nd week each trainee administered the scale and scored in 10 patients. By the end of this phase a control of the results was performed.

SECOND PHASE: During the 3rd week the heads of the physiotherapy and nursing department had the role of the trainer. Each trainer (head of physiotherapy or sister) was responsible for training the subordinates of their department. Again during the first hour the trainer referred to the theoretical part of the specified subject. In the 4th week each trainee administered the scale in 10 different patients. At the end result check was performed.

Results: Every member of the staff is more aware of the functional abilities and limitations of each patient and taking that into account they help the patient progress in their rehabilitation program. The notes of the team meeting are now better orientated towards the goals of the patients.

Conclusion: Rehabilitation is a multidisciplinary process and the final outcome is based on combined group effort of all team members. Recognizing the patient's abilities plays a crucial part in achieving the goals set for the patient.

Key words: education, rehabilitation process, FIM scale

EARLY REHABILITATION IN THE STROKE UNIT – PRELIMINARY RESULTS

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Introduction: Major breakthroughs in the treatment of strokes over the past 20 years are considered rTPA application and nothing less stroke units. Doubt about the contribution of the stroke units, was completely overcome by report of Cochrane Collaboration group. According to this analysis the specific organization of health care and patient care fundamentally has changed the outcome, both in terms of survival and by the functional improvement and independence. However, among many procedures of early rehabilitation, there is still uncertainty regarding very early mobilization (out-of-bed activity within 24 hours of stroke symptom onset). In order to gain their own experiences regarding early mobilization of stroke patients, an open-randomized study was initiated.

Materials and methods: Twelve subjects were drawn from consecutively admitted stroke patients of Department of Emergency Neurology Clinical Center of Serbia and randomized between very early rehabilitation (experimental group) vs. conventional rehabilitation procedures (control group). Experimental group was treated for two weeks after stroke at least twice per day; in addition to their usual care, 7 days per week. Physiologic monitoring of blood pressure, heart rate, oxygen saturation, and temperature before each mobilization within the first 3 days of stroke. In addition to safety outcome measures (death and/or number of serious adverse events at 3 months, falls) we have evaluated modified Rankin score (mRS) as measure of functional outcome at admission in clinic, at discharge and three months after stroke.

Results: Between the two groups of patients studied, previously carefully balanced in relation to stroke severity, significant differences are not observed, in terms of safety measures (adverse events) as well as in terms of the degree of motor function recovery 3 months after stroke, as measured by mRS.

Conclusions: Very early rehabilitation (including out of bed activities) for stroke patients within the first 24 hours is probably safe method, but it can not be confirmed because of very small number of patients tested. Further examination on large patients sample will provide us more reliable estimation about potential value of such treatment.

Key words: Stroke – rehabilitation – outcome

COMPLICATIONS DURING REHABILITATION OF PATIENTS WITH STROKE

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Introduction: Successful rehabilitation of patients after stroke is often accompanied by complications. They have long - term effects of real estate, reduced pulmonary ventilation, and pressure on body parts from the local blood circulation disorder, difficulty maintaining personal hygiene, exposure to the impact of uncontrolled urination and defecation, and a series of unfortunate circumstances that often accompany stroke, which have a positive effect on the occurrence of complications such as thrombosis, pneumonia, and pressure ulcers.

Materials and methods: We research a sample of 128 patients on rehabilitation after stroke in ZZMR “Dr Miroslav Zotović” in Banja Luka, during 4 month in 2013. We analyzed age, sex, type of stroke, neurological deficits by body sided, mobility at the beginning of treatment, independence in personal hygiene, the occurrence of dysphagia, urinary incontinence and loss of control of defecation. The occurrence of complications (thrombosis, pneumonia and pressure ulcers) at the beginning, middle and end of rehabilitation were analyzed.

Results: The average age of the sample was 66.78 years ($\pm 12:01$) in a range of 18 to 88 years. Up to 65 years of age was 38.3%, and 24.2 to 60% of the sample. Male gender was frequent than women. Rehabilitation after a stroke for up to 100 days began 75% of patients, a14, 1% of patients were included one year after stroke (repeated physical treatment). The most common type of stroke was ischemic stroke with 83.6%, followed by intracerebral hemorrhage with 8.6%, subarachnoid hemorrhage with 3, 9%, and other causes with 3.9% of the sample. With left-sided neurological deficits were 43.8%, right-sided 44.5% double-sided 11.7% of patients. Independently movable were 32.8%, moving with support 29.7% and 37.5% immobile patients.

The sample contained 45.3% of patients completely dependent on other people’s care and support, 26.6% partially dependent and 28.1% of patients independent. Swallowing disorder is present in 7.8% of patients. Speech and language impairments were registered at 33.6% of patients. 40.6% patients don’t have urination control and 14.8% defecation control. Thrombosis is not registered in any patient. On admission 5 patients had pressure ulcers. At one patient it was in beginning, and the other four have already developed. In the middle period of rehabilitation the same 5 patients had pressure ulcers, on the end of rehabilitation only 2 patients, the others were repaired. Four patients with pressure ulcers were in the category of immobile patients, and one in the category of moving with support. Four patients were totally dependent on other people’s care and support, and one was a partially dependent. Two totally dependent patients had not to repair pressure ulcers by the end of the rehabilitation period. On admission to rehabilitation is not registered neither pneumonia. Three patients during rehabilitation developed pneumonia, at two patients in the central part of the rehabilitation, and in one at the end of rehabilitation. Of these, two patients were in the category of fixed and one in the category movable with support. All three patients with pneumonia were totally dependent on other people’s care and support.

Conclusions: Complications during rehabilitation after stroke may be reduced to a minimum with good care and using appropriate methods of prevention. Age of a patient, personal hygiene maintenance and level of mobility were significantly related to occurrence of complications.

Key words: Stroke, complication, pressure ulcers, thrombosis, pneumonia, dependent on other people’s care and support

**BOTULINUM TOXIN FOR SPASTIC HAND IN LEFT MCA ISCHEMIC STROKE PATIENT
AFTER 20 YEARS OF EVOLUTION**

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Introduction: To demonstrate the effectiveness of treatment with Botulinum Toxin (BT) started after 20 years of evolution of MCA ischemic stroke in a 44 year - old patient with non - functional hand, aphasia, right hemiplegia and a non - functional hand.

Materials and methods: The clinical evaluation before the treatment showed spasticity in the right upper limb measured by the modified Ashworth Scale (MAS): elbow 3/4, wrist 2/4 pronator quadratus 2/4, thumb 3/4. The patient performed flexion and extension movements of the elbow and finger flexion with the thumb in palm deformity. The patient had the ability to pick up objects, but he wasn't able to release them (due to the thumb in palm deformity). BT was injected using 300U of Xeomin (incobotulinumtoxin A) distributed as follows: Biceps brachialis 100U, brachialis 50U, brachioradialis 50U, flexor carpi 50U, adductor pollicis 25U and opponens pollicis 25U.

Results: Nowadays, after the treatment, the patient's clinical evaluation shows at the right upper extremity a spasticity measured by MAS as follows: elbow 2/4, wrist 2/4, pronator quadratus 2/4 and thumb 2/4. The patient is able to extend all fingers; he also presents less thumb adduction and can grab and release objects. The patient has improved walking through the improvement of the elbow flexion synergy. He can also descend the stairs clutching the railing.

Conclusions: In this patient we have found the effectiveness of treatment despite the time elapsed since the stroke until we started with BT treatment, and the success of BT injections

Key words: Botulinum toxin, non-functional hand, 20 years stroke

PHYSICAL AND COGNITIVE IMPACT OF TRAUMATIC BRAIN INJURY

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Introduction: The Rehabilitation Network of Merseyside and Cheshire provides all specialist rehabilitation for patients with severe disability, including after traumatic brain injury (TBI), for a population of 2.4 million. This study examined the etiologies, duration of stay and physical and cognitive impairment observed following TBI.

Materials and methods: A case notes review was conducted for all patients admitted to the Walton Network Rehabilitation Unit (NRU) between July 2009 and April 2013 with a diagnosis of TBI. Information was collated from medical, nursing, therapy, psychology and imaging records on both etiology and the subsequent physical, cognitive and psychological impacts of TBI.

Results: There were 36 patients, 86% males, with median GCS 7 and median age of 41 years. Although only 53% of patients had frontal lobe lesions on imaging, 94% had cognitive deficits on assessment, and 67% had psychological problems requiring intervention. Median length of NRU stay was 63 days. Patients admitted earlier to rehabilitation ward had a shorter duration of stay, which was statistically significant ($r = 0.42$ CI 95% $0.07 < r < 0.68$). Improvement in Functional Independence Measure (FIM) scores positively correlated with increased length of stay at NRU ($R^2 = 0.271$, Pearson correlation coefficient ($r = 0.521$) and mean increase in score, from admission to discharge, was 33.2. Physical impairments of note included: reduced mobility (72%), spasticity (53%), urinary and bowel incontinence (47% & 19%) respectively, speech disturbance (69%), dysphagia (42%), cranial nerve damage (39%) and visual disturbance (19%). Psychological complications were reported in 23 patients (64%). The most common causes of TBI were falls (36%), assault (31%) and road traffic accidents (28%), with other causes such as sporting injuries accounting for the remaining (5%). Alcohol use was implicated in 22.2% of cases reviewed, with a further 5.6% of patients reporting a previous history of alcohol abuse.

Conclusion: Following severe TBI, most patients have cognitive, psychological and multiple physical disabilities. Our findings suggest that early rehabilitation following TBI may shorten the length of stay; further work is underway to see if this may be due to timely multidisciplinary treatment of these complex disabilities.

Key words: Traumatic Brain Injury, Neurorehabilitation, Acute rehabilitation

HYPOPITUITARISM AFTER TRAUMATIC BRAIN INJURY: CASE REPORT

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Introduction: TBI (traumatic brain injury) may frequently cause hypothalamic–pituitary dysfunction, contributing to a delayed recovery from TBI. Hypopituitarism can be a subclinical condition, identified only by hormonal tests, or its clinical manifestations can be acute and severe, pointing toward the need for immediate treatment. Clinical manifestations are variable depending of hormone affected. Those include apathy, muscle weakness and cognitive dysfunction, asthenia, cold intolerance (TSH deficiency with normal/low T4 due to secondary hypothyroidism), diabetes insipidus with polyuria, polydipsia, nocturia (secondary to antidiuretic hormone (ADH) insufficiency), fatigue, mood impairment, insomnia, loss of libido, impaired sexual function, loss of hair (FSH/LH, testosterone deficiency due to hypogonadism), hypotension (cortisol deficiency secondary to adrenal insufficiency).

Case Report: A 21-year-old man was referred to our centre for rehabilitation after 5 months severe TBI. He was in a confuse-agitated response state with severe impairment of cognition (attention, memory). In the initial assessment he had clinical polyuria, hypernatremia and low urinary osmolality. He also had normal T4 and low TSH level. Normal FSH and LH levels associated with high testosterone levels were founded. He was diagnosed hypopituitarism with diabetes insipidus, hypothyroidism and hypogonadism. He was initially treated with desmopressin intranasal 1 mcg/day and levothyroxine 0,05 mcg/day. During the first year bi-monthly routine assessment (thyroid function and electrolytes) were taken. 7 months after-TBI he was had one episode of mild hyponatremia (129 mmol/l) and low urinary osmolality (263 mOsm/kg) - he was placed on fluid restriction (1000 mL/day), suspended desmopressin, and had data normalization within 10 days. The patient resolved most of cognitive deficits, behaving appropriately in familiar settings and performing daily routines automatically.

Conclusions: The most post-TBI neuroendocrinopathies secondary to hypopituitarism include hypothyroidism, diabetes insipidus and hypogonadism. Diabetes insipidus is rarely permanent however in this case ADH replacement (desmopressin) was needed in the acute phase. In the follow-up he was diagnosed mild hyponatremia - fluid restriction and desmopressin suspension normalized data. Hypothyroidism was treated with levothyroxine. Treatment management was based by bi-monthly routine biochemical assessment. This case report reinforces the need for identification of hormonal deficiencies, proper treatment and routine biochemical assessment during the first year post-TBI, in order to optimize patient recovery, improve their life quality, and avoid the negative consequences of non-treated hypopituitarism in the long term.

Key words: Traumatic brain injury; hypopituitarism

ENDOCRINE COMPLICATIONS FOLLOWING BRAIN INJURY

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Introduction: The greatest challenge associated with endocrine complications in patients with brain injury (BI) is early recognition of these subtle problems. Endocrine complications can generate significant impact on the progress and outcome of BI rehabilitation. Prompt diagnosis and treatment of endocrine complications following BI facilitate the rehabilitation process of patients with BI. We aim to raise awareness of Brain injury induced Endocrinopathies and the need for appropriate Endocrinological testing.

Materials and methods: We present a case of 45 year old male patient who sustained high voltage electrocution injury, resulted in Ventricular Fibrillation (VT) cardiac arrest. His heart rhythm reversed to sinus rhythm after first cardiac resuscitation at the scene, but unfortunately he sustained hypoxic brain injury. He had computed tomography (CT) scan of brain that showed no evidence of intracranial contusion or haematoma, No abnormal mass effect or any gross cerebral oedema. He acquired burns to occipital region and left fingers. In first day after the incident He developed seizure and he was commenced on phenytoin. He had tracheostomy and Percutaneous Endoscopic Gastrostomy tube (PEG) inserted and he was transferred to rehabilitation centre. He had frequent episodes of autonomic dysfunction presenting with high temperature, tachycardia and sweating, these episodes were interfering him to engage in his rehabilitation program and needed through investigations. Lastly He was commenced on propranolol and his symptoms improved significantly. Regular blood monitoring showed evidence of electrolyte abnormality including Hyponatremia of 150 mMol/L, elevated Serum Osmolality 316 mosm/kg with Normal urine Osmolality, Normal urine sodium and Normal urine potassium. Pituitary function test including, testosterone, Cortisol, TSH, FT4, FSH and LH, Prolactin, IGF-1 were satisfactory.

Results: Patient reviewed by endocrinologist and he was diagnosed Isolated Diabetes Insipidus. His symptoms were managed successfully with regular water flushes through the PEG and Desmopressin.

Conclusions: Most post - BI endocrinopathies do not attribute to specific history patterns. Clinician should have higher suspicion to endocrinopathies if patient with brain injury had facial fractures, cranial nerve injuries, and dysautonomia. Routine basal Pituitary function testing should be performed on any patient who has been hospitalized with a BI and who has electrolyte abnormality. Prospectively, all patients who had a BI, regardless of its severity, should undergo a baseline hormonal evaluation 3 and 12 months after the primary brain injury. We recommend close collaboration between divisions of Endocrinology and Rehabilitation to facilitate screening for endocrinopathies in patients after BI.

Key words: Brain injury, Diabetes Insipidus, Hyponatremia, Endocrinopathy, Dysautonomia

THE CLINICAL CHALLENGE OF SYNDROME OF INAPPROPRIATE ANTIDIURETIC HORMONE SECRETION - CASE REPORT

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Introduction: The greatest challenge associated with endocrine complications in individuals with traumatic brain injury (TBI) is early recognition on subtle problems. Syndrome of inappropriate antidiuretic hormone (SIADH) is the most common TBI-associated neuroendocrinopathy causing hyponatremia. Almost all cases resolve spontaneously with recovery from brain injury. Clinical evaluation may be difficult because of confounding deficits, so the clinician should have a high index of suspicion. Uncorrected endocrine disorders may limit cognitive and behavioral recovery and lead to serious physical sequelae. The lack of agreement on which endocrine abnormalities are most common unfortunately precludes the development of a simple screening strategy. Differentiation from others causes such as cerebral salt-wasting (CSW) syndrome, hypothyroidism or ACTH deficiency can be challenging. However distinguish them is important because treatment options differ. The management of SIADH-induced euvoletic hyponatraemia has traditionally been fluid restriction.

Below, we present one case study to illustrate the current challenges of SIADH.

Case Report: A 59-year-old man was referred to our rehabilitation center for rehabilitation 6 months after severe TBI (subarachnoid haemorrhage, complicated with intracranial hypertension, seizures and submitted cranioplasty complicated with cerebral contusion immediately before the admission). He had been diagnosed 2 months evolution hyponatremia. In the initial assessment he turned out to have hyponatraemia of 113 mmol/L. In an additional work-up CSW, primary polydipsia, inappropriate fluid hypothyroidism, diabetes insipidus and medication were excluded. Therefore, based on clinical euvoletic and the biochemical data (low urinary osmolality 238mOsm/kg; decreased plasma uric acid 1,04 mg/dl and normal plasma potassium 5,36 mmol/L) the working diagnosis was SIADH secondary to TBI. He was placed on fluid restriction (1000 mL/day), furosemide 40mg/day and salt dietary supplement (4g/day), which increased serum sodium to 133 mmol/L in 7 days. The treatment lasted 3 months, with normalization of the biochemical data.

Conclusions: Hyponatraemia is the commonest electrolyte imbalance in rehabilitation center inpatients, and it is associated with large and significant morbidity and mortality. We have adopted a pragmatic approach to hyponatraemia, in which classification of causation is based on clinical and biochemical estimation of extracellular volume status. This divides hyponatraemia into hypovolemic, euvoletic and hypervolemic aetiologies. A policy of routine inclusion of measurement of thyroid hormones, urinary osmolality, plasma uric acid in all patients with apparent SIADH due to neurosurgical conditions such as traumatic brain injury, subarachnoid haemorrhage, should be adopted.

Key words: Traumatic brain injury; hyponatremia; syndrome of inappropriate antidiuretic hormone

DYSPHONIA AS A PRIMARY MANIFESTATION IN MYASTHENIA GRAVIS: A CASE REPORT

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Introduction: Myasthenia Gravis (MG) is a chronic autoimmune disease caused by a defect in neuromuscular transmission owing to an antibody-mediated attack on acetylcholine receptors at neuromuscular junctions, and that is characterized by fluctuating weakness and abnormal fatigability of muscles. The incidence is about 1/100.000 cases in the general population. Also, 1/3 are presented in the elderly population. Usually is recognized with ocular complaints or generalized muscle weakness because the fatigability of peripheral skeletal muscle is the hallmark of the disease. But it can be absent in the bulbar forms, being dysphonia and dysphagia the most common manifestations. So, dysphonia is an atypical and relatively rare onset of MG. Also, MG is a masquerader in elderly persons, as the symptoms can be mistaken for age-associated changes or another acute morbid condition. This two facts can difficult the diagnosis. Electrophysiological evaluation, laboratory studies and anticholinesterase agent test (using edrophonium, neostigmine or pyridostigmine) can confirm the diagnosis. Conventional treatment is based on oral pyridostigmine. Response can be less satisfactory in elderly patients. Moreover, thymomas are more common in this population. So they present higher morbidity and mortality, being necessary an exhaustive screening.

Materials and methods: A case whose initial and prominent complaint was dysphonia and that was misdiagnosed is presented to alert the clinician to the fact that voice changes can be the first and only sign of neurologic disease. Our case involves a 73-year-old woman who had been suffering from nasal speech and chronic hoarseness for two years. No associated symptoms such as limb weakness or respiratory and ocular problems were described. Her past medical history was unremarkable except for hypertension. She was cognitively intact and independent in activities of daily living.

Results: Flexible fibroendoscopic examination did not reveal significant anomalies, and the computer tomography scan of cavum was normal. Then, she was referred for phoniatric assesment. Tongue weakness and palate muscle paralysis, as well as absence of gag and palatal reflex were observed. No chewing problems were related. Suspecting a neurological disease, further studies were performed. Laboratory studies revealed an acetylcholine receptor antibody test positive at 15.9 mmol/L (normal range 0.0 to 0.2). Single-fiber electromyography was normal. A repetitive stimulatory test of the left facial nerve, which response was recorded from the *orbicularis oculi* muscle, showed a pathological decrement of amplitude in the baseline and post-exercise studies. No thymoma was found. As a result, based on dysphonia, higher level of circulating antibody to acetylcholine receptor and typical electrophysiologic changes, a diagnosis of MG could be made definitively. A treatment with oral pyridostigmine 60 mg 4 times a day was started. At follow-up 6 months later, she was completely asymptomatic.

Conclusions: Patients with dysphonia as their initial symptom of MG may complain of vocal fatigue, difficulty sustaining or projecting their voices, breathy voice or intermittent hoarseness. Because of confusion with signs of the aging process or from age-related comorbidities, it has been suggested that MG might be underdiagnosed or misdiagnosed in older people. So, a possible diagnosis of MG should be taken into consideration in cases with isolated dysphonic signs of uncertain origin.

Key words: myasthenia gravis; dysphonia; dysphagia

STATIN USE AND RISK OF AMYOTROPHIC LATERAL SCLEROSIS

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Introduction: HMG-CoA reductase inhibitor drugs (statins) are well known causes for Myalgias, and may result in elevated serum Creatine Phosphate Kinase (CPK) levels, myopathy, and even rhabdomyolysis. The use of statins however has rarely been reported for being associated with neuromuscular degenerative disease and amyotrophic lateral sclerosis (ALS). Here we present a case of ALS to raise awareness of this association.

Materials and methods: We report a 70 year old retired male patient, who presented with gradual weakness of his legs; he had previous history of Myocardial Infarction and was taking Atorvastatin, Asprin, Ramipril and Omacor. He was seen in outpatient clinic and initial examination showed reduced power in hip flexors (right more left), with normal tone and normal reflexes. Blood investigations revealed significantly elevated CPK (2403IU/Litre); Diagnosis of myopathy secondary to statin usage was made and he was advised to discontinue Atorvastatin. After one month, his repeat CPK was 1500IU/L. Two months later he acknowledged that his symptoms were worsening despite discontinuation of statin. Clinical examination revealed further weakness in his lower limbs again more significant in right side with normal tone and reflexes. Repeat CPK came back at 1800IU/L. Further investigation including Muscle Biopsy and Electromyography (EMG) were arranged, Muscle Biopsy excluded myositis and vasculitis. MRI scan showed oedematous muscle in lower limbs. EMG showed neurogenic changes with fibrillation potential suggesting anterior horn cell disease.

Results: Patient was referred to the Neurologist and was diagnosed as having ALS. He was commenced on Reluzole. Unfortunately Patient died 7 months after his initial presentation. The cause of death was type two respiratory failure secondary to ALS.

Conclusions: In cases of statin induced Myopathy, elevated CPK levels can take months to resolve after statin withdrawal. Studies indicate that any risk of ALS associated with statin use is probably small, however, this case demonstrates that in cases of prolonged persistence of symptoms and elevated CPK, clinicians should be aware of underlying muscle or nerve disorder that statin exposure may have uncovered. We suggest that neurological consultation should be considered to evaluate for an underlying neurological disorder if neuromuscular symptoms do not respond within a few months of statin withdrawal.

Key words: Statin, Amyotrophic lateral sclerosis, Myopathy

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**PATIENTS WITH THE MARFAN SYNDROME AND CEREBRAL STROKE: NOT AN ODD
COUPLE**

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Two young patients, male and female, with mild cerebral stroke, were admitted to our Department of Rehabilitation Medicine. They were known to suffer from the Marfan Syndrome. This association is relatively rare, and apart of the clinical course, the literature review will be given.

**THE ROLE OF EARLY REHABILITATION AFTER OPERATION OF ANEURYSMAL
SUBARAHNOID HEMORRHAGE IN ACUTE TERM**

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Introduction Early rehabilitation consists of measures which are taken at an early stage of a disease or injury, with the aim to prevent development of complications of organ systems caused by the illness or prolonged bed rest. Consequences of subarachnoid hemorrhage (SAH) are motor and cognitive lesions, which cause social and work-related impairment and influence the quality of life, as well as social integrity of the patient. Cognitive function is associated with a poor functional recovery and lower quality of life. There are no data indicating the best moment to start early rehabilitation after acute period surgery of aneurysmal hemorrhaging. The Clinic for Physical and Rehabilitation Medicine of Clinical Center of Serbia uses specific algorithms for rehabilitation of patients after acute period surgery of aneurysmal hemorrhaging.

The aim of the study was to investigate the effects of early rehabilitation of patients after acute period surgery of subarachnoid aneurysmal hemorrhage.

Materials and methods A 62 years old female patient felt a severe headache in early morning hours, followed by nausea and vomiting. The patient was examined in Emergency Center by a neurologist and a neurosurgeon since she was suspected of SAH. The patient was admitted to the hospital the same day. Personal anamnesis was negative.

Results Patient was operated in acute period of aneurysmal SAH, and rehabilitation was conducted according to the algorithm for acute period surgeries. On the first postoperative day the patient had stable vital parameters, and she was administered drug therapy, the patient showed no neurologic deficits from the 1st to 9th day from attack: resting (without kinezytherapy because of the possibility of vasospasm occurrence), prevention of deep vein thrombosis, elevation of the upper body (30 – 45 degrees). The same condition and the same rehabilitation treatment continued until the 11th day from the attack. After that, bed exercises and controlled verticalization (sitting with elastic bandages on lower limbs) were started. On the twelfth day from the attack, all the procedures were repeated and further verticalization continued (standing, walking). In the beginning the patient was walking with therapists for two days, and after that period independently under supervision of therapists. Score of FIM test was 126. MMSE 30.

Conclusions: Right time procedures at early stage, individually and with the adequate concept of physical therapy influence prevention of complications, as well as functional rehabilitation of patient to the great extent.

Key words: Early rehabilitation, acute period, SAH, verticalisation

FEVER OF CENTRAL ORIGIN TREATED WITH PROPRANOLOL IN HAEMORRHAGIC STROKE. A CASE REPORT

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Introduction: Fever appears approximately in 25% of stroke. Its origin - usually infectious - is unknown in a minority of the cases. Neurogenic fever results from a disruption in the hypothalamic set point temperature, probably due to central mechanisms like hypothalamic lesions or segregation of endogenous pyrogens, causing an abnormal increase in body temperature. Many drugs have successfully been used to treat neurogenic fever, like bromocriptine, amantadine, dantrolene and propranolol. The authors describe a clinical case of neurogenic fever in a hemorrhagic stroke successfully controlled with propranolol.

Materials and methods: Consultation of clinical process data from a patient with hemorrhagic stroke admitted to a rehabilitation center.

Results: 25 year old Caucasian male with a past clinical history of hemorrhagic stroke and spastic tetraplegia 9 months prior referral to our Rehabilitation Center. He had been treated with propranolol, 120 mg/day, in the previous medical care facility but the clinical data did not allow the explaining why he was taking such medication. We tried to reduce this medication in order to improve lethargy and lentification as he had normal vital signs. 2 days after reducing propranolol to a lower dose (60 mg/day), the patient developed fever (38°C). He showed no signs of infection on the physical examination, had normal red and white blood cell counts, hepatic and kidney function, normal chest X-ray and urinalysis. We assumed that fever could have been caused by a central mechanism, was and we increased propranolol to its initial dosage (120 mg/day). After only one day of pharmacological adjustment, the fever ceased.

Conclusions: Fever in stroke and traumatic brain injuries without documented infection may have central origin. This type of fever has a defined model with its own characteristics, in a different way from infectious fever. Propranolol can play an important role to control central fever and consequent injuries due to high core temperatures in patients with stroke.

Key words: Propranolol, haemorrhagic stroke

REHABILITATION TREATMENT OF PATIENT WITH BROWN SEQUARD SYNDROMA AND PTSD CAUSED BY DOMESTIC VIOLENCE – CASE REPORT

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Introduction: Brown Sequard syndrome (BSS) is rare neurological condition characterised by an incomplete spinal cord lesion which results in ipsilateral weakness or paralysis of the body and loss of pain and temperature on the opposite side. It may be caused by spinal cord trauma (fracture, stab wound, tumor).

Objective: To present the teamwork necessity in the rehabilitation patient with the Brown Sequard syndrome and PTSD caused by domestic violence.

Patient: 73 years old woman, victim of domestic violence, admitted on rehabilitation treatment with paralysis of the left side of the body caused by axe wound on the left side of her neck and multifragmental fracture of the 4th vertebra of cervical spine. Clinical examination on the beginning of the rehabilitation: Neck was immobilised by cervical orthosis, with a very poor and painful movements. Left side of the body was paralysed, flaccid, without any voluntary movement. On the right side of the body there were no pain sensations. Patient was not able to walk and had no ability to transfer from lying to sitting position without assistance of other person, but maintained balance in sitting position. She was anxious, had night terrors and „flash backs“, and diagnosed PTSD by psychiatrist.

Methods: From the beginning of the treatment all members of the rehabilitation team (doctors, nurses, physiotherapist, occupational therapist, psychologist, somatoped, social worker and family) were involved. Her daughters were included in psycho-social support programme.

Results: Three months later patient was discharged in much better condition. She had voluntary movements in the left hip, knee and ankle and walked without assistance. There were voluntary movements in the hand, but shoulder and elbow were still immobile. PTSD was significantly reduced.

Conclusion: Participation and mutual efforts of rehabilitation team members, together with members of patient's family, resulted in the significant motor and mental recovery of the patient who suffered of BSS and PTSD caused by domestic violence.

Key words: teamwork, BSS, violence

RASMUSSEN ENCEPHALITIS (A CASE REPORT)

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Introduction: Rasmussen's encephalitis is a rare, chronic inflammatory neurological disease that usually affects only one hemisphere of the brain. It usually occurs in children under the age of 10 (more rarely in adolescents and adults), and is characterized by frequent and severe seizures, loss of motor skills and speech, paralysis on one side of the body (hemiparesis), inflammation of the brain (encephalitis), and mental deterioration. The objective of this paper is to show the usefulness of physical therapy in treatment Rasmussen encephalitis.

Materials and methods: Female patient named K.S., 24 years old, right hand dominance. Perinatal history is unremarkable. No prodromal period. Epilepsy started acutely on March the 18th, 2013. like acute occurrence of twitching of index finger and thumb of the left hand. Progression of seizures during 28 months: Very frequent and violent tonic-clonic seizures of left arm, left part of the neck and left side of face, till 20 seizures daily. Immune modifying therapy with steroids, plasmapheresis and antiepileptic drug therapy did not give any improve results. Final choice of therapy: Right hemispherectomy on February 4th, 2013. Postoperative riddance from seizures with the expected neurological deficits. In our institution patient was treated during 21 days. Clinical state at admission to our hospital: ranges with adherence, paretic scheme of walking, left knee in recurvation, the Romberg unstable with a tendency to fall to the left. In the left upper extremity with no active movement. Bartel index 58 (severe dependence). The psychological profile of reduced volitional dynamism. Rating by Hamilton Depression Rating Scale 15 (middle level).

Results: The results after completion of complex medical rehabilitation: More stable during walking, in left hand improved range of active movement, mostly at the level of the shoulder and elbow, and in left leg at the level of the knee. Bartel index 76 (moderate dependence: self dressing, transfer and climbing stairs). The psychological profile showy evident improvement: willing urge is improved-according to Hamilton scale 10-mild depression).

Conclusions: Although the surgery was a final solution for stopping persistent seizures, as a result in the clinical state, however remained higher neurological deficit than before. Accordingly, the process of physical medical rehabilitation is a very important segment of the final treatment to improve the quality of everyday life.

Keywords: Rasmussen, encephalitis, seizures, paresis, rehabilitation

IMPORTANCE OF COMPLEX APPROACH IN REHABILITATION OF PATIENT WITH ANOREXIA PSYCHOSIS

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Introduction: Anorexia psychosis is a mental disorder in which a person keeps reducing food intake, leading to heavy exhaustion of one's body and real life-threatening situation, when weight is 25% less than usual. In Western European countries, there has been more and more talking about epidemic of this disorder. Cause of this illness is multifactorial, videlicet, it is conditioned by biological, sociological and psychological factors. The cause cannot be brought down to the effect of a single factor. Otherwise, treatment would be simple and prognosis wouldn't be so severe and uncertain. Practically, disease occurs in the specific origination of bio – psycho – social components. Therapy is the integration of the knowledge of a team and the interventions undertaken, with a certain regularity adjusted to a given patient.

Patient, 21 years old, is a student admitted to inpatient rehabilitation in the state of tetraplegia, caused by anorexia psychosis, facies hypocratica, immobile, with no active movements in upper/ lower extremities, speech in the form of alalia, with no response to orders. During the process of rehabilitation, patient was involved in the work of the whole rehabilitation team (physiatrist, physical therapist, occupational therapist, nurse, special rehabilitation pathologist, speech therapist, psychologist, social worker). Therapeutic results were continuously evaluated in terms of motor skills, speech, psychomotor skills, behavior and social adaptation of the patient, whereby, all team members were contributing, each in their area of expertise.

Materials and method: For diagnostic evaluation and monitoring of the progress of the patient, when working with a patient, tests were used to assess motor index, Barthel index, scale for the assessment of psychomotor organization and Boston Diagnostic Aphasia Examination. In addition to tests, physical procedures were carried out, as well as occupational therapy, hydrotherapy, psychomotor re-education therapy, speech therapy exercises and psychosocial therapy.

Results: Rehabilitation treatment, which with intermittent lasted 2.5 years, resulted in significant motor recovery, reduction of disability in terms of ADL (Activities of Daily Living), as confirmed by Barthel index, which is the beginning of the treatment had a score of 0, indicating complete functional disability, and the final test shows the total score of 97 which indicates complete independence in all aspects of life, including the continuation of study in college. Assessment of psychomotor organization totaled indicates a complete mismatch of PM structures, and the final test indicates the lower limit of the normal range. Boston Diagnostic Aphasia Examination on the first estimate was under below normal values, unproductive and disabled speech, on the last and supports the significant progress in the area of speech production for normal productive verbal communications with mild dysarthria elements.

Conclusions: The results achieved in the rehabilitation of the young patient with severe motor deficits in terms of tetraplegia and psychosomatic disorders occurring as a result of anorexia psychosis, are achieved by engaging a multidisciplinary team. The importance of complex approach to rehabilitation lies in achieving a higher level of independent living and integration of the patient in all aspects of life.

Key words: anorexia psychosis, complex rehabilitation, a multidisciplinary team

IS THE PHYSICAL EXAMINATION SUFFICIENT FOR THE DIAGNOSIS OF CARPAL TUNNEL SYNDROME?

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Introduction Carpal tunnel syndrome is the most common entrapment neuropathy of upper extremities. The diagnosis is usually based on the patient's history and physical examination. The golden standard for diagnosis of median nerve compression is electromyoneurography (EMNG). The aim of this study was to assess diagnostic accuracy (sensitivity, specificity, positive and negative predictive values, and area under the ROC curve) of clinical symptoms and signs - "flick sign", Tinel and Phalen sign for the diagnosis of carpal tunnel syndrome in relation to EMNG finding.

Materials and methods Prospective study included 79 patients (70 females and 9 males), mean age 56 ± 10.6 years, who had EMNG confirmed compressive lesions of median nerve of at least one hand. EMNG was preceded by history (evidence of "flick sign" - this refers to asking the patients what they do with the hand at night when they experience symptoms. If the patient demonstrates a 'shaking out' movement of flicking the wrists then the sign is positive) and physical examination, which included, provocative tests Phalen (tingling in the median nerve distribution induced by full flexion of the wrists for up to 60 seconds) and Tinel (gentle tapping over the median nerve in the carpal tunnel region elicits tingling in the nerve's distribution). EMNG finding was considered positive if the prolonged terminal latency of the motor and/or sensitive median nerve and/or reduced sensory conduction velocities of median nerve are observed. Data were statistically analyzed by using SPSS 16 for Windows.

Results : Characteristic EMNG findings for carpal tunnel syndrome were found in 131 hands in 79 patients. Compared with EMNG test we found that sensitivity of "flick sign" for the diagnosis of carpal tunnel syndrome was 78%, specificity (Sp) 81%, positive predictive value (PPV) 95%, negative predictive value (NPV) 43%, and area under the ROC curve 0.797. Tinel's sign had Sn 64%, Sp 85%, PPV 95%, NPV 33% and the calculated area under the ROC curve was 0.747. Sensitivity of Phalen sign was 77%, Sp 70%, PPV 93%, NPV 39% and the area under the ROC curve 0.737. The specificity and PPV of the simultaneous presence of all three signs was 100%, with 45% Sn and NPV 27% and area under the ROC curve 0.725.

Conclusions "Flick sign", Tinel and Phalen signs are individually equally sensitive and specific indicators of median nerve entrapment, but the definitive diagnosis still requires EMNG review. The simultaneous presence of all three clinical signs is sufficient for the diagnosis of carpal tunnel syndrome and the initiation of a treatment.

Key words carpal tunnel syndrome, electromyoneurography, "Flick sign", Tinel sign, Phalen sign

OBTURATOR NEUROPATHY. CASE REPORT

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Introduction: Obturator neuropathy (ON) is a difficult clinical problem to evaluate. Symptoms include medial thigh or groin pain, weakness with leg adduction, and sensory loss in the medial thigh of the affected side. The best test for diagnosis is by electromyography (EMG). Pharmacologic management of pain and physical therapy can be helpful in the acute phase of injury. Obturator neuropathy is a rare condition that may result from orthopedic, gynecological, or urological procedures, tumor compression or sports-related injuries.

Materials and methods: A 63-year-old man was remitted by Urology for proximal weakness in his right leg. He had been diagnosed of high-grade bladder carcinoma (Broders III-IV) in 2008, and underwent bladder transurethral resection. Tumor recurrence was observed in a recent control CT scan, and radical cystoprostatectomy and a Bricker's cutaneous uretero-ileostomy was performed. During the intervention the patient had a lithotomic position for several hours.

He complained of weakness in his right thigh which prevented him from driving. Exploration highlighted muscular balance of thigh adductors 2/5, and light sensory loss in the proximal medial thigh. Obturator neuropathy was suspected and further on confirmed by EMG. Rehabilitation treatment was implemented, which included neurostimulation and therapeutic exercise to improve muscular strength of the adductors. Four months after surgery the recovery was complete.

Results: The lithotomic position in long surgical procedures may be one of the factors causing a lesion by compression of the obturator nerve. Groin pain and sensory loss in the medial thigh are the most common clinical manifestation of obturator neuropathy, but in our patient the most worrying symptom was the paresis of adductors. We emphasized the incapacity of driving caused by the neuropathy to our patient, (because the accelerator and brake pedals are managed by the right leg), which was recovered at the end of the rehabilitation treatment.

Conclusions: Obturator neuropathy is a rare complication after urological procedures, being one of the causes the compression of the nerve by a prolonged lithotomic position. Conservative treatment (analgesic and physical therapy) is the treatment of election. Surgical approach should be considered in cases of refractory pain or motor deficit of the adductor muscle after failure of conservative treatment.

Key words: Obturator neuropathy, cystectomy, rehabilitation

LATERAL FEMORAL CUTANEOUS NERVE INJURY AFTER ABDOMINOPLASTY: CASE PRESENTATION

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Introduction: The lateral femoral cutaneous nerve is a purely sensory nerve, originating from the L2 and L3 spinal roots and supplying the skin over the anterolateral surface of the thigh. Entrapment neuropathy of this nerve is known as meralgia paresthetica. It may be idiopathic, but causes include pregnancy, obesity, or tight clothing or seat belt. Other possible causes include factors such as bone graft using iliac bone, pelvic surgery, inguinal hernia repair, trauma, abdominal mass and metabolic or toxic diseases. Regardless of the etiology, a lateral femoral cutaneous nerve lesion causes burning pain and paresthesia in the anterolateral thigh, which is the innervation area of the nerve. It may be confused with lumbar radiculopathy and hip problems due to location of the pain.

Case: A 44-year-old female patient presented to our outpatients with symptoms of pain and paresthesia on the upper outer part of the left thigh. Her history revealed that her symptoms had started after abdominoplasty surgery performed a month ago, and the symptoms increased with standing and walking. Her medical history had nothing of significance except for the abdominoplasty surgery that had performed for obesity. Physical examination revealed hypoesthesia in the left lateral femoral cutaneous sensory distribution area. In the electrodiagnostic studies, the lateral femoral cutaneous sensory nerve action potential amplitudes could not be obtained. Other nerve conduction studies were normal range. No evidence supporting lumbar radiculopathy was found on needle electromyography. The cortical somatosensory evoked potential (SEP) response latencies obtained with left lateral femoral cutaneous nerve distribution area stimulation were delayed and had smaller amplitudes than in the right in the SEP study. These findings were consistent with left lateral femoral cutaneous nerve injury and gabapentin 2400 mg/day was started after dose titration.

Conclusions: Lateral femoral cutaneous nerve damage is usually idiopathic but may develop in an iatrogenic manner after surgical procedures and may be confused especially with low back pain and hip problems. It should be considered in symptoms related to the anterolateral aspect of the thigh. It can usually be treated with simple recommendations and treatment methods.

Key words: Lateral femoral cutaneous nerve, abdominoplasty, meralgia paresthetica

IATROGENIC SPINAL ACCESSORY NERVE PALSY: A CASE REPORT

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Introduction: The spinal accessory nerve (SAN) is the pure motor innervation to the trapezius and sternocleidomastoid (SCM) muscles. The trapezius muscle is one of the major muscles that stabilize the scapula during rotation, elevating the upper limb and retracting the scapula. Consequently, SAN palsy causes weakness of the trapezius muscle. The patient usually has a dropping shoulder, winging of the scapula, and weakness during forward elevation. The occurrence of SCM muscle palsy is rare, and leads to weakness of contralateral rotation of the neck. We present a case with iatrogenic SAN palsy.

Case: A 30-year-old female presented to our outpatient with symptoms of pain on the right shoulder and difficulty in overhead activities over a three - month period. She expressed having been operated for papillary thyroid carcinoma three months ago in her history and the symptoms had started after the operation. She had undergone bilateral total thyroidectomy and right modified radical neck dissection for the papillary thyroid carcinoma. Her physical examination revealed a dropped right shoulder and atrophic appearance in the upper part of the trapezius muscle. Rotation of the neck to the left was restricted and the right SCM muscle was short and tense. Passive shoulder joint range of motion was full. She completed active shoulder abduction in the right with great difficulty after 90 degrees and winging of the right scapula was seen during abduction. Neurological examination revealed a mild to moderate loss of strength in the right trapezius and SCM muscles. Nerve conduction study of the SANs showed low amplitude and prolonged latency of nerve potential on the right side when compared with the left side. Other nerve conduction studies in the upper extremities were normal. An increase in mild contraction polyphasic motor unit potentials and decrease in full contraction recruitment pattern in the right upper trapezius and SCM muscles were observed during needle electromyography (EMG). No abnormal finding was found with needle EMGs of the right infraspinatus, serratus anterior, levator scapulae, rhomboid major, and deltoid muscles. These findings were consistent with a partial lesion of the spinal accessory nerve proximal to the SCM muscle innervation. The patient was administered 14 sessions of a physical therapy program consisting of electrical stimulation to the trapezius muscle, progressive strengthening exercises, posture exercises, and joint range of motion and stretching exercises.

Conclusions: Iatrogenic SAN lesions after surgical procedures such as lymph node biopsy, neck dissection, and carotid endarterectomy are the most common causes for this type of nerve palsy. Early diagnosis is usually delayed because the indefinite clinical signs such as atrophy of the trapezius muscle are not easily visualized at early clinical inspection. We therefore wanted to emphasize the importance of a detailed history and physical examination during the evaluation of patients presenting with shoulder pain. SAN palsy should be considered in the differential diagnosis in the presence of a history of surgical intervention, especially in the neck region.

Key words: Spinal accessory palsy, iatrogenic, neck dissection

THE EFFECTS OF LOW LEVEL LASER THERAPY IN FACIAL NERVE PALSY

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Introduction: Bell's palsy is defined as an idiopathic peripheral facial nerve paralysis of sudden onset and it is considered the most common cause of facial nerve paralysis. The aim of this study was to evaluate clinical effects of low level laser therapy compared with various physical therapy modalities on functional outcome following idiopathic facial palsy.

Materials and method: Between January 2009 and March 2013, 32 patients with severe facial palsy (House Brackmann grading score V or VI) were referred to the Specialized Hospital for Rehabilitation Bukovička Banja of Aranđelovac. All the patients were observed by neurologist and ENT specialist before starting rehabilitation. Majority of them (90%) underwent pharmacological treatments with glucocorticoid drugs. They were separated into two groups. Group I consisted of 16 patients aged between 21 and 77 (average age 46) that received LLLT (wavelength 820 nm) applied in projection of stylomastoid foramen in stationary skin contact method (frequency 2500 Hz, energy density 1.0 J/cm²) and along main facial nerve branches at the affected side (fr. 80Hz, energy density 0.5 J / cm² per point up to 20 points), five times a week, 15 to 25 sessions depending on response to treatment. Group II consisted of 16 patients aged between 22 and 76 (average age 50) who received various forms of physical therapy modalities such as electrotherapy, kinesiotherapy, superficial heat therapy. The time between onset of symptoms and rehabilitation ranged between 2 - 7 days (mean 5). Facial nerve recovery was clinically evaluated according to the House Brackmann grading system. Follow up was done once a week during a first month and subsequently once a two weeks until recovery was done or in a case with incomplete recovery with defective healing until patients did not show any improvement for a further of 4 months.

Results: Results were analyzed by appropriate descriptive and analytical statistical methods (mean, SD, Min, Max, Mann-Whitney test). Both groups showed improvement in facial muscle function. The facial nerve score after 4 weeks of treatment was significantly more severe ($p < 0.001$) in the control group compared to the LLLT group. Complete recovery was observed in all patients in LLLT group opposite to 75 % in control group ($p > 0.05$). The time required for complete recovery of facial nerve function was significantly shorter ($p < 0.001$) in the LLLT group than in control group.

Conclusions: It can be concluded that LLLT shows beneficial effects in recovery of facial nerve function reducing the time of paralysis.

Key words: LLLT, facial palsy, House Brackmann

PLACEBO AS A SPECIFIC THERAPEUTIC APPROACH IN PHYSICAL MEDICINE AND REHABILITATION

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This study includes modern research and the latest views on one of the most controversial medical aspects – the placebo effect. Even though more than a century has passed since this term was introduced to modern medicine, the placebo effect is still not fully understood. We can say that today there isn't a medical branch where the placebo effect is not present, as with pharmacological medication, in medical procedures that can also have placebo effect (ECT, surgery, stimulation on non-acupuncture spots). Several factors have great importance due to their influence on the placebo, such as cultural, specific characteristics of the patient's personality, his expectations, characteristics of the therapist, the nature of the therapeutic procedure, also the existence of people who are susceptible to the placebo effect. The possibility of recognizing these patients with laboratory methods has been considered. Placebo is representative and efficient in treating some forms of depression, and in the treatment of pain. The placebo effect and its research are an important topic in modern clinical trials.

Keywords: placebo effect, nocebo effect, characteristics of personality

MELKERSSON - ROSENTHAL SYNDROME: A CASE REPORT AND LITERATURE REVIEW

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Introduction: Melkersson-Rosenthal Syndrome (MRS) is a rare neuromucocutaneous disorder, consisting of a triad of persistent or recurrent orofacial edema, relapsing facial paralysis and fissured tongue. As the etiology remains unknown, diagnosis and treatment of MRS is challenging. The purpose of this work is to report a clinical case and to discuss the etiopathogenesis, clinical features, differential diagnosis and treatment options for MRS. Awareness of this syndrome should enhance our clinical acumen and enable an improved assessment of this disorder.

Material and methods: A literature review was performed in order to assess the course of symptoms, differential diagnosis, histopathological findings, treatment and follow-up recommendations for patients with MRS.

The authors report a clinical case of a patient with the classic triad of MRS.

Results/Discussion: The authors present a twenty-one years old female patient with a complete right lower motor neuron facial nerve paralysis (FNP) and facial edema with a fissured tongue. There was no history of systemic symptoms, trauma or past/recent injuries. Laboratory findings were normal. The patient was medicated with oral corticosteroids (CT), eye protection measures and started a rehabilitation treatment. This was the patient's third episode of FNP. All the episodes affected alternating sides of the face. At the age of eleven, she had the first episode, which was diagnosed as Bell's palsy. She was medicated with CT and attended a rehabilitation program with full recovery. There was no family history of MRS. The case described fits within the classic triad of MRS. The complete triad of symptoms is uncommon, varying from 8 to 25%. The most frequent complaint of MRS is facial edema and enlargement of the lips. FNP occurs least often and is indistinguishable from a classic Bell's Palsy.

The etiology of MRS remains unclear and the diagnosis is essentially clinical. In a patient with persistent or recurrent orofacial edema, the presence of at least one of the findings of idiopathic FNP or lingua plicata is sufficient to make definitive diagnosis of MRS. However, biopsy may help to diagnose MRS and to exclude Crohn's disease and sarcoidosis. In this case, there was no evidence of other associated disorders, so the diagnosis of MRS was made.

In this literature review we found scarce information about the prognosis of MRS. Many studies claim that, over time, some findings may become permanent. Treatment of MRS seems to be difficult, mainly because the etiology remains unknown and it is probably connected with a pathogenetic background. The treatment approach of facial palsy should follow the same principles used in Bell's palsy. However, a prophylactic decompression to prevent recurrent FNP may be considered.

Conclusions: The MRS may present over the course of most of the lifespan and may require several years of observation to be diagnosed. With the disease progression, the FNP episodes become more frequent and lasting, and may cause residual paresis and syncinesis. Physiatriests should consider the diagnoses of MRS in the presence of any recurrent FNP and/or chronic facial swelling. Comprehensive approach in differential diagnosis of FNP is highlighted, in order to avoid misdiagnosis and to provide prompt treatment planning with better prognosis. Therefore, we recommend a pluridisciplinary evaluation of MRS's patients with a regular follow-up.

Key-words: melkersson-rosenthal; syndrome; facial palsy

PREDICTIV VELUES OF C - REACTIVE PROTEIN IN DETECTION OF CORONARY HEART DISEASE IN PATIENTS WITH POSITIVE ERGOMETRI

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The main role in originate, development and evolution of atherosclerotic lesion have inflammatory response. It is believed that the high-sensitivity C-reactive protein (hs-CRP) is indicator of acute inflammatory answer. Hs-CRP has a long plasma half-life and is now understood to be a mediator as well as marker of atherothrombotic disease.

Purpose of this study was to investigate whether measurement of high-sensitivity C-reactive protein could be of help to predict stres induced myocardial ischemia and in evaluation of atherosclerosis.

Methods: Study included 122 patients (91 male and 31 female) average age of 57 ± 7 , who had chest pain. Patients who had acute and chronic inflammatory disease, were excluded from the study. All patients underwent measuring lipid status (total cholesterol, low-density lipoprotein cholesterol and high-density lipoprotein cholesterol) and nonlipid risk factors (body mass index, smoking, diabetes, hypertension and fibrinogen). The first samples of hs-CRP were collected before ergometri and second samples 24 hour after ergometri. Patients were divided in two groups according of positively ergometri. 32 patients with positive ergometri undergo coronary angiography.

Results: In first group with negative ergometri there were 78 patients and the second group had 44 patients with positive ergometri. We had statistical significance different in lipid status between groups only on high-density lipoprotein cholesterol ($p < 0,05$). So, there was no difference in hs-CRP level within the same group, but there was significance different between the groups before and after the ergometri ($p < 0,05$). In the group with positive ergometri, coronary angiography find was next: 8 patients had one-vessel, 14 patients had two-vessel and 10 patients had three-vessel disease. Values of hs-CRP are significantly higher in patients with positive ergometri. Ergometri doesn't effect on levels of hs-CRP.

Conclusions: Hs-CRP is independent predict of future cardiovascular events, who add prognostic informations on lipid screening and non-invasion metods. This finding point out that level of inflammation (mesured with hs-CRP) is much more dependent on pathoanatomy end on proces alteration in coronary artery while physical loading and induced myocardial ischemia are practicly without effects on hs-CRP level.

Keywords: High-sensitivity C-reactive protein, ergometri, myocardial ischemia

**PULMONARY FUNCTION IN PATIENTS WITH SPINAL CORD LESIONS
AFTER COMPLETING PRIMARY REHABILITATION AT URI SOČA**

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Aims: Persons with spinal cord lesions are at a greater risk for pulmonary complications. Degree of impairment of lung function depends on the level and completeness of lesion, age, gender and associated pulmonary diseases. The higher level of lesion decreases FVC (forced ventilatory capacity) and FEV1 (forced expiratory volume in 1 second). At the level of cervical and high thoracic spinal cord lesion predominates increased parasympathetic tone in the lungs due to interruption of sympathetic innervation, which leads to an increased tone of the smooth muscle in the small airways of a reduced diameter small airways. The purpose of the study is to confirm that higher level of injury decreases FVC as well as Tiffeneau index (TI), as an indication of obstruction.

Methods: The study included 55 patients with spinal cord lesions after completing primary rehabilitation at URI Soča. We divided patients into 3 groups according to the level of lesion. In the group of cervical spinal cord lesion is 20 patients, of which male-dominated (15), in the group of high thoracic lesion (TH6-TH1) were men only. The overall low thoracic and lumbar lesion 26 subjects were also dominated by men (22). After the standard procedure, and calibration, we performed spirometry (Viasys Healthcare). We measured FVC (forced ventilatory capacity), FEV1 (Forced expiratory volume in 1 second), and calculate the TI, according to the NHANES II standards.

Results: When analyzing the obtained values of FVC, we found that among patients with cervical lesion compared to lower levels of lesion are statistically significant differences (p-value = 0.032). In analyzing the value of TI is not statistically significant.

Conclusion: FVC decreases with higher lever injury. Spirometry is less sensitive method to monitor airway obstruction in subjects with spinal cord lesion above the level of TH6.

Key words: spinal cord lesion, spirometry FVC, TI, obstruction

FIBROMYALGIA - THERAPEUTIC ASPECTS

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Introduction: Fibromyalgia (FM) is a chronic pain condition with spontaneous chronic widespread musculoskeletal pain and tenderness accompanied by a number of nonspecific symptoms (fatigue, sleep disturbance, cognitive changes, mood disturbance, and other variable somatic symptoms), with unknown etiology and which affects up to 5% of the general population worldwide. Low prevalence of FM is considered an underestimation and results from an insufficient knowledge about FM. Furthermore, pathophysiological mechanisms of FM are difficult to identify and current drug therapies demonstrate limited effectiveness, only focused to the management of single symptoms.

Diagnostic criteria: The new ACR criteria (2010) introduced the *symptom severity (SS) scale score*, which is a summary score from scales measuring the extent of fatigue, unrefreshed sleep, cognitive problems, and multiplicity of symptoms (such as headache, weakness, bowel problems, nausea, dizziness, numbness/tingling, hair loss) and the *widespread pain index (WPI)*. The new criteria obligate you to pay careful attention to the patient if you want to diagnose fibromyalgia.

Treatment: According to multiple pathophysiological mechanisms, the treatment involves multidisciplinary and multimodal approach, including a combination of pharmacological and nonpharmacological interventions based on recommendations: the American Pain Society (APS-2005), the European League Against Rheumatism (EULAR) (2007), the Association of the Scientific Medical Societies in Germany (AWMF) (2008), and Canadian Rheumatology Association (CRA) (2012). Pharmacological treatment (antidepressants, anticonvulsants and conventional analgesics) is directed toward pain and other symptoms control, but nonpharmacological management (aerobic exercise, strength training and cognitive behavioral therapy) is directed to functional consequences of the symptoms. CBT even for a short time is useful and can help reduce fear of pain and fear of activity. Patients should be encouraged to identify specific goals regarding health status and quality of life at the initiation of treatment, with reevaluation of goals during the follow-up. Although the treatment rarely relieves the symptoms completely, active role of educated FM patient and supportive surrounding are secondary necessary to provide beneficial clinical effects on this complex painful condition.

Key words: Fibromyalgia syndrome; Systematic review; Evidence - based guidelines, treatment

THE EFFECT OF LOW-LEVEL LASER THERAPY ON HAND FUNCTION AND QUALITY OF LIFE IN CARPAL TUNNEL SYNDROME

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Introduction: Low - level laser therapy (LLLT) has been found to have positive effects in the treatment of various musculoskeletal conditions. We aimed to evaluate the effects of LLLT used for idiopathic carpal tunnel syndrome (CTS) on the clinical and electrophysiological parameters and health-related quality of life in this study.

Materials and methods: A total of 49 hands of 26 female patients (mean age 54.65 ± 09.06 years) with symptoms of paresthesia and pain in their hands in whom the diagnosis of CTS was verified with electroneuromyographic examination were included in the study. All patients received 12 sessions of LLLT for 4 weeks (670 nm, continuous, 10 mW, 0.5 J/per point). The treatment was applied to 8 points on the skin overlying the transverse carpal ligament. Clinical assessments were performed at baseline, at the end of the treatment and at three months during follow-up. The presence of day and night paresthesia and pain in the last 2 weeks was queried and patients were evaluated with clinical variables such as Tinel's, Phalen's and reverse Phalen's test, sensory testing with monofilaments, abductor pollicis brevis (APB) muscle strength, handgrip test and pinch meter measurement, symptom severity score (SSS), functional status score (FSS) and the Short Form-36. In addition electrophysiologic studies were performed twice, just before and 3 months after the treatment.

Results: A significant improvement was seen at the end of the treatment regarding day and night paresthesia, pain, the Tinel's, Phalen's and reverse Phalen's test results, in FSS and SSS scores, the palmar, fingertip and lateral grip and APB muscle strength ($p < 0.05$). Moreover palmar grip, fingertip grip and FDS score significantly increased in the third month follow-up ($p < 0.05$). No significant increase was observed in hand grip strength and monofilament test results after treatment compared to before treatment but a statistically significant increase was observed in the third-month follow-up ($p < 0.05$). While scores for the physical function, pain, mental health status and energy level subscales of the quality of life increased after treatment ($p < 0.05$), the energy level also showed an increase in the third month follow-up ($p < 0.05$). Physical role difficulty and social function values were similar before and after treatment but had significantly increased by the third-month follow-up ($p < 0.05$). When the pre-treatment and third month post-treatment electrophysiological parameters were compared, median nerve motor distal latency, 3rd digit antidromic distal sensory latency, median sensorial nerve velocity at 3rd digit-wrist segment, median sensorial nerve action potential amplitude at palm-wrist segment measures statistically significant improvements were found ($p < 0.05$).

Conclusions: At the end of the three-month follow-up, we believe that LLLT may be a good conservative treatment method in the treatment of patients with CTS due to the improvement in clinical and electrophysiological parameters and quality of life we observed. However, randomized, controlled and large-scale studies are required to support our results.

Key words: Carpal tunnel syndrome, low-level laser therapy, electroneuromyography

ISOMETRIC DYNAMOMETRIC MEASUREMENTS OF MUSCLE FORCE AND SPECIFIC EXERCISES AGAINST LOW BACK PAIN

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Introduction: 500 patients with different musculoskeletal problems were measured with the dynamometer in the Health Centre Maribor, Slovenia. Among these, 136 patients with chronic low back pain (Clbp) were examined.

Materials and methods: To ascertain the differences between the forces of the specific muscle groups, strength tests were applied to trunk and hip flexors, trunk and hip extensors, trunk rotators (left and right) and hip abductors using dynamometer Eval Express (J TECH Medical, Utah, ZDA). Each patient was measured before and after the kinesiotherapeutic programme (treatment). 114 patients had improved the muscle force of specific muscles with specific, targeted exercises. 22 patients were directed to other specialists.

Results: After the first measurements, it was ascertained that 78 patients had weak trunk rotators, hip flexors, abductors and extensors, 24 patients had weak trunk extensors and 12 patients had weak trunk flexors. On the basis of the muscle force measurements, the individual kinesiotherapeutic programme was established.

Conclusions: The results show that kinesiotherapeutic treatment was successful. It shortened the rehabilitation time and patients' pain.

Key words: low back pain, specific exercises, isometric dynamometric measurements

ASSOCIATION OF VITAMIN D AND THE RISK OF FALLS IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Introduction: Vitamin D deficiency is widespread and has been associated with many chronic diseases, including osteoporosis. Besides its well-known functions in bone homeostasis (Bikle, 2007), it plays a role in the falls prevention (Bischoff-Ferrari, 2011).

Objective: This study was undertaken to explore the impact of vitamin D deficiency on a reduction in risk of falls at postmenopausal women with diagnosed osteoporosis (OP).

Method: In the prospective study we examined the status of vitamin D at postmenopausal women with OP, referred to our Institute from Jan 2012 till June 2012. Exclusion criteria were diseases and disorders which effects the risk of falls. Collected data included gender, age and self-reported duration of menopause. BMD was measured at lumbar spine, left and right femoral neck and total hip (DXA, Lunar Prodigy Advance). Vitamin D (25-OH) levels were measured from serum samples by an electrochemiluminescent immunoassay analysis (ECLIA, Cobas e 411), according to the manufacturer's instructions. Vitamin D deficiency was defined as ≤ 50 nmol/L and insufficiency as ≤ 75 nmol/L. To predict the risk of falls, we analyzed: balance (Tandem Standing Test), walking speed (m/sec.), muscle strength, walking and muscle function (Timed Up & Go Test). Statistical analyses were performed using SPSS v.20.

Results: Out of 58 women with OP (mean age 65.57 ± 7.18 ; age range 54 to 82 years) evaluation revealed vitamin D insufficiency at 21 (36.2%) and deficiency at 26 (44.8%) of participants. Mean concentration of vitamin D (25-OH) in whole sample was 55.36 ± 20.01 nmol/L (16.20 to 95.03 nmol/L). The prevalence of vitamin D deficiency was significantly higher compared to normal concentrations ($p < 0.01$). The high risk of falls according to balance test was determined at 15 (25.8%), walking speed at 45 (77.5%), muscle strength at 37 (63.7%) and walking and muscle function at 38 (65.5%) of participants. These tests showed statistically high risk of falls in participants with vitamin D deficiency ($p < 0.01$).

Conclusion: Our study showed a high prevalence of vitamin D deficiency at postmenopausal women with osteoporosis. Decrease of vitamin D concentration was associated with increased risk of falling. The results suggest that, although the menopause and vitamin D levels are correlated ($p < 0.01$), both are good independent predictors of risk of falls.

Key words: vitamin D, risk of falls, postmenopausal osteoporosis

COMBINED APPLICATION OF INTRA-ARTICULAR HYALURONATE INJECTIONS AND LASER THERAPY IN GONARTHROSIS TREATMENT

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Introduction: Arthrosis of the knee is one of the most common chronic degenerative rheumatic diseases. In addition to medical therapy (NSAIL, analgesics) treatment includes also hondroprotectors (orally or intraarticular use) and physical therapy (electrotherapy, laser therapy). **Object:** To compare the effects of laser therapy applied after application of intra - articular hyaluronate injections and laser therapy on pain points in order to reduce pain and increase range of motion in patient with gonarthrosis.

Materials and methods: 22 patients (14 women and 8 man) age of (60 to 74) are included and prospectively followed during gonarthrosis treatment at Institute of Rheumatology, Belgrade in the period 2009 - 2011. Diagnosis is made on ACR criteria (4 - 14 years ago). Pain is measured by VAS scale (Visual analog scale, 1-100 mm) before and after therapy. Ankle movement is measured with ankle arthromeres in degrees before and after competition of therapy. Patients are randomly assigned in two groups: First group with 12 patients, 8 women and 4 man, age (60 - 72 years), average $67,3 \pm 4,38$ and second group with 10 patients (6 woman and 4 men) age 64 to 76 years, average $67,8 \pm 4,04$. The disease is in the first group lasted 6 - 14years, average of 9.83 ± 2.48 , and in-group II lasted 4-12 years, average 7.20 ± 2.52 . Both groups are comparable in age, gender distribution and gonarthrosis duration. Laser used in this study was Mediclaser 637 Electronic design, valve length of 780 Nm, and power of 70 mW. Patients in the first group received 3 injections of sodium hyaluronate, the preparation of hyaluronic acid (high concentration of 30 mg / 2 ml and the high molecular weight of 0.6 million Daltons by one to seven days to one knee under ultrasound control. After the last injection laser therapy started after five days. Patient in the second group were treated by laser on painful spots in both groups with LPL fr 2500 Hz, 60 sec., volume 70 MW and 2.1 J/cm² dose of X 3x weekly therapy in 10 consecutive doses. Evaluation of treatment in both groups were performed before and after the end of treatment and statistically analyzed in Windows SPSS 16 program

Results: 1. Analyzing the VAS scale data we found in group I significant decrease in pain before ($81,66 \pm 8,34$) and after therapy ($26,66 \pm 7,78$). In group II, significant decrease in pain before ($86,0 \pm 5,16$) and after therapy ($41.0 \pm 8,75$). It estimated high statistical significance in both groups, Kruskal Wallis test, $p < 0,001$.

2. In measuring ankle movement amplitude, mean flexion angle before therapy for the first group was $80,83 \pm 10,83$ and $126,6 \pm 11,54$ after treatment. In a second group the amplitude was $88,0 \pm 9,18$ before therapy and $112,0 \pm 9,18$ after treatment. High statistical significance is achieved also in improvement of ankle flexion amplitude in both groups (Kruskal Wallis test, $p < 0,001$).

3. Statistically significant reduction in pain and increased mobility achieved in group I (Mann – Whitney $p < 0,05$).

Conclusions: The analysis showed that laser therapy after intra-articular injection of hyaluronate and laser therapy on pain spots have high efficacy in reducing pain and increasing mobility of the knee joint in patients with gonartrosis, but the application of the laser after administration of intra-articular injection of hyaluronate has showed better efficiency.

Key words: Goanrthrosis, intra-articular hyaluronate injections, laser-therapy

IMPORTANCE OF USING SCREENING TOOLS TO IDENTIFY NEUROPATHIC PAIN

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Introduction: Neuropathic pain (NP) is caused by damage or dysfunction of the peripheral and/or central nervous system, rather than stimulation of pain receptors. It can involve any level of the nervous system. Pain is subjective phenomenon and it makes sense to examine verbal descriptions when we diagnose pain type. Recognition of the NP, finding difficult 66 % of general practitioners, 50 % of rheumatologists and 33 % of neurologists.

Aim of this study was to review the literature regarding the most recommending screening tools for assessment of NP.

Materials and methods: Electronic databases were searched for guidelines in the last three years, using a combination of terms such as NP, guidelines and assessment. Criteria for choosing the tools were: sensitivity, specificity and time needed to finish the evaluation with recommended tools for NP.

Results: We found that the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS), the Douleur Neuropathique en 4 questions (DN4), PainDETECT and the Neuropathic Pain Questionnaire (NPQ) are the most common recommended screening tools for NP. LANSS had sensitivity, range 82 – 91 %, and specificity range 80 – 94 %. The DN4 showed 83 % sensitivity and 90% specificity. PainDETECT showed 85 % sensitivity and 80 % specificity. The NPQ demonstrated 66 % sensitivity and 74 % specificity. LANSS and DN4 had the lowest number of items and they required the shortest time to finish the screening.

Conclusions: LANSS and DN4 are the easiest used specific tools for NP. They have the greatest sensitivity and specificity among the recommended screening tools according the guidelines for NP which are published in the last three years. They include both, the interview and clinical examination. With recommended screening tools it is able to identify the potential patients with NP, particularly by non-specialists. But in 10 - 20 % of patients with clinically diagnosed NP, these tools fail to identify NP. Validation of these screening tools in Serbian language is obligatory.

Key words: neuropathic pain, assessment, guidelines

ULTRASOUND ASSESSMENT OF LUMBAR MULTIFIDUS AND TRANSVERSUS ABDOMINIS MUSCLE IN LBP AND NON LBP SUBJECTS

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Introduction: Transversus abdominis and lumbar multifidus muscle have been proposed to play key role in stability of the lumbosacral spine. The muscles' functional and/or structural deficits have been linked to the low back pain (LBP) syndrome. Evaluation of the transversus abdominis and lumbar multifidus muscle in clinical practice is scarce and not well defined due to number of reasons. Our aim was to investigate the potential of ultrasound imaging in assessing these muscles.

Materials and methods: 98 participants were recruited for this cross sectional study: 56 subjects with LBP and 42 non LBP subjects. Demographic and past medical history data were acquired. Level of pain was assessed by 11-point Numeric Pain Rating Scale to assess pain intensity. Oswestry Low Back Pain Disability Questionnaire was administered to assess self-reported disability in everyday life. Ultrasound imaging was conducted using Toshiba Diagnostic Ultrasound System (Nemio SSA-550°, 3.75 MHz curvilinear probe. The images were acquired in B – mode. The thickness of the muscles at rest and during activation was assessed by the rater, who was blinded to the group assignment. TrA and LM muscle thickness was measured bilaterally using the on-screen calipers, once a day on the three consecutive days.

Results: Age, body mass index, and distribution by gender were not significantly different between LBP and healthy subjects. The LBP subjects reported on average moderate levels of pain lasting nearly 3 months prior to enrollment and causing moderate levels of disability. Healthy males had significantly thicker TrA at rest and contraction, than healthy females ($p < 0,000$). No significant difference in relative thickness change was found across gender in healthy subjects ($p > 0,000$). The thickness of LM was not significantly different between healthy males and females at rest ($p = 0,517$), contraction ($p = 0,726$) nor in relative thickness change ($p = 0,125$). The relative change of TrA thickness during activation was statistically significant between LBP and non LBP subjects ($p < 0,000$). The relative increase of LM thickness was also significantly higher in healthy subjects ($p < 0,000$).

Conclusions: Healthy males have significantly thicker TrA at rest and activation than females. There is no statistically significant difference between healthy males and females in LM thickness at rest and activation. The relative change of muscle thickness for TrA and LM did not differ across gender in healthy subjects. The relative change of the muscle thickness for both TrA and LM at rest and activation was statistically higher in healthy subject than in participants with LBP.

Key words: low back pain, lumbar multifidus muscle, transversus abdominis muscle, ultrasound

EPIDEMIOLOGY OF NEUROPATHIC PAIN - IMPORTANT LINK TO THERAPEUTIC STRATEGY

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Introduction Neuropathic pain is defined as pain arising as a direct consequence of a lesion or a disease affecting the somatosensory system. All neuropathic pains are associated with poor general health, comparable with other severe chronic diseases. Although neuropathic pain can be acute in nature, in most patients the pain is persistent (or “refractory”). Chronic neuropathic pain is a common presentation in clinical practice, it greatly impairs the quality of life, and poses a major economic burden to society. Aim of this study was to review the literature regarding distribution, prevalence and incidence of neuropathic pain. A diagnosis of neuropathic pain and its cause may be delayed or missed because neuropathy generally develops very gradually and people with the condition may be unaware of it. Neuropathic pain is a symptom of many different conditions, so a thorough medical evaluation is needed to ensure an accurate diagnosis of the reason for neuropathic pain.

Materials and methods Electronic database PubMed were searched for articles which were dealing with distribution, prevalence and incidence of neuropathic pain.

Results The prevalence of pain predominantly of neuropathic origin has been reported as 7–8% in French and UK surveys, and is more intense in comparison with chronic pain without neuropathic characteristics. Neuropathic pain is a rather frequent condition with an annual incidence of almost 1% of the general population and women are more often affected. A higher prevalence of chronic pain with neuropathic characteristics was associated with middle age (50–64 years), manual professions and those living in rural areas. It was more frequently located in the lower limbs and its intensity and duration were higher in comparison with chronic pain without neuropathic characteristics. The main causes of neuropathic pain vary geographically. In developing countries, infectious diseases such as human immunodeficiency virus (HIV) infection and leprosy, trauma (e.g., due to war wounds and amputations) and radiculopathies related to spinal column diseases are among the most common causes of neuropathic pain. Regarding phantom limb pain, it may occur during the first year after amputation in 53% to 85% of patients. In developed countries, the most frequent causes of neuropathic pain are diabetic polyneuropathy and radiculopathies with neuropathic pain components. The best estimate of overall prevalence of painful diabetic peripheral neuropathy in the diabetic population is 15%. The prevalence of central pain in Multiple Sclerosis was 22.6%.

Conclusions: The true incidence of neuropathic pain in different health conditions is under-diagnosed. The observed distribution rates often differs between geographic setting, time period evaluated, source of data, and diagnostic or disease definitions. The nature and epidemiology of pain and especially neuropathic pain is very important link to complete therapeutic strategy and avoid misdiagnoses and to choose right therapeutic direction.

Key words: Neuropathic pain, incidence, prevalence, epidemiology, therapeutic strategy

IMPORTANCE OF CLINICAL DIAGNOSIS ON A QUALITY OF LIFE OF PATIENT SICK OF ASTHMA

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"Asthma is a chronic inflammation of respiratory functions in which many cells including mastocyte, eosinophile i T-lumphocyte."

There are three symptoms which are characteristic for Asthma: wheezing; dispnea; cough

The aim of this work is to perceive influence of dispnea with wheezing in breath; miken and also to the influence of obstruction in respiratory function by auscultaty diagnosis.

METHOD AND RESULTS: Studying is divided into three groups: toward the symptoms of dispnea with the wheezing I group (47) - without dispnea but with wheezing; II group (15) - dispnea with wheezing under the effort; III group (38) dispnea with wheezing without the effort. And toward the presence of pathologic noise there are four groups:

I group (18 patients) no pathologic noise; II group (41) high wheezing III group (64) low wheezing; IV (35) polyphon wheezing.

Toward level of obstruction and quality of life, patients are divided in three groups:

I group : (22 patients) < 60% ; II group : (31 patient) od 60 do 80 %; III group : (47 patient) > 80%

Detail anamnesis clinical diagnosis and study of pulmonary function is taken from all patient. At the same time questionnaire of the quality - of life was applied (AQLQ). Like we could expect the wheezing had in the district of symptoms ($P < 0,0005$). There was very high statistic difference between among all scores of AQLQ of questionnaire, except the influence of other factors. Presence of pathologic noise in lungs tall influences on a district of limitation of activity of symptoms, emotional condition symptoms and on a total score of QOL of the patient.

All questionnaire scores had the highest values with patients with normal auscultatory diagnosis (I group and lowest with patient who had polyphon wheezing (IV group).

Presence of pathologic noise had the highest influence on a district of symptom of disease ($p < 0,0005$).

In a conclusion we can say that symptoms of asthma and obstruction in respiratory functions analysing by auscultatory diagnosis had a big influence on a QOL. Numerous clinical studying testified the correlation between subjectively perception of health condition of the patients and objectively diagnosis.

DIABETES MELLITUS AND LIMB AMPUTATION

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Diabetes mellitus is a chronic condition characterized by disorder in metabolic balance of glycemia, lipids and proteins. This condition is followed by general disfunctioning and decreased functioning of various organs (eyes, kidneys, nerves, heart and blood vessels). The prevalence of this condition is 2,5% in our country. Due to its aggressive progression and disorders on micro- and macrocirculation level, ie. the impairments on arterial wall membranes, it is likely to expect an amputation of an impaired limb up to 90% as a final outcome.

When neither a conservative treatment nor reconstructive surgery lead to recovery, an amputation becomes inevitable.

The most common is a partial foot amputation, then below-limb and above-knee amputation. Four percent of unilateral amputations become bilateral in 12 months time.

Specific characteristics of prosthetic rehabilitation are present in all phases of rehabilitation and require a specialized team approach.

The Special Hospital for Prosthetics and Rehabilitation, conducted a retrospective study of the period from 1.1.2013. to 30.6.2013.god, during which treated 252 patients, of whom 137 suffered from the DM, 97 men and women were 38. Svi patients with complications of DM.

Prolonged wound healing with increased risk of complications may slow down the rehabilitation process. It is necessary that skin of the residual limb be frequently inspected to enable successful prosthetic fitting. The choice of materials and prosthetic components during prosthetic prescription is a crucial condition for the efficient rehabilitation. The treatment is organized according to the patient's general condition, skin quality and integrity, vascular status of the valid limb, neurological status and present diabetic complications. Frequent instability of metabolic disorders (hyper and hypoglycemia), obesity, muscular weakness, joint conditions, sight impairments, increased consumption of oxygen while working out, cognitive disabilities, sensibility disturbances, frequent infections present the parameters taken into consideration for prosthetic rehabilitation and make it more complex. Numerous methods of physical and kinesitherapeutical procedures are used within regular program of prosthetic rehabilitation for the purpose of rehabilitation. After prosthetic fitting, prosthetic training requires well-controlled gradual loading of all functional segments. Functional capability is lowered in comparison to the other causes of amputation. Prosthetic use is time-limited. The stated facts lessen the quality of life of patients. With the aim of preventing further medical complications patients are advised to be on a specific hygienic-dietetic regime with the adequate medicament therapy, regular check-ups and monitoring comorbidities.

Key words: diabetes mellitus, amputation, prosthetic rehabilitation

STATE OF THE ART OF TRANSFEMORAL SOCKETS IN COLOMBIA

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Introduction: In Colombia, most of the amputees have difficult access to rehabilitation services because they live on the countryside and have low incomes. The quality of life of transfemoral amputees depends mainly on the level of comfort brought by the socket because this is the element that has direct contact with the residual limb. Sockets are custom made elements of transfemoral prosthesis that work as the interphase between the residual limb and the prosthesis. Due to this fact, that component requires the presence of the amputee for its fabrication; therefore, they can only be developed by the local rehabilitation centers.

Materials and methods: Interviews to the main Colombian sockets manufactures or physiatrists were made in order to establish the characteristics of the sockets developed by Colombian prosthetic workshops. The main focus of the interviews was the material and manufacturing process use to the fabrication of the sockets. The targeted workshops are located in main Colombian cities like Bogota, Medellin, Cali, and Bucaramanga.

Results: The rehabilitation centers are located in the main cities of the country where they manufacture, basically, thermoformed sockets with materials like polypropylene. The typical fabrication process in Colombia starts with a negative cast from the residual limb, which is used afterwards to create the positive cast where the polymer is thermoformed. The polymer is not thermoformed following the exact shape of the residual limb, but has some differences in order to apply or relief pressure according to the limb shape.

Conclusions: The socket manufacturing process depends primarily on the expertise of the prosthetic technician. Additionally, there have been no big improvements on this field in the last decade in Colombia as well as in other developing countries. In this article the state of the art of transfemoral sockets in Colombia is established as a first step on the developing of a new design that can improve the quality of life of Colombian amputees.

Key words: transfemoral amputee, socket, quality of life

REHABILITATION OF POLYTRAUMATIZED CHILDREN WITH AMPUTATIONS

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Introduction: The most common cause of acquired amputations in children is trauma during play or a malignant disease after the age of five. Polytrauma leads to multiple-site damage and a serious decrease of function. Complex hospital rehabilitation in phases is necessary when the trauma causes limb amputation and fractures of other parts of head, body and limbs.

Materials and methods: The review of general and prosthetic rehabilitation delivered to two children with polytrauma and limb amputation hospitalized in Specialized Hospital for Rehabilitation and Orthopedic Prosthetics in 2012. After the surgical treatment, the children underwent kinesiotherapy, physical and occupational therapy, prosthetic fitting and a simultaneous psychotherapy and functional education, in the presence of their parents, achieving the optimal independence and functionality. Parameters of general and specific functions were followed (Wee FIM, TM, TV, Stump characteristics, Narang, ROM, MMT, interview...) through all the phases of rehabilitation.

Results: A girl, V.C., aged 12, injured by an agricultural device while playing: the jaw and facial fractures, fractures of above-knee and below-knee bones of left leg, transfemoral amputation of the right leg, multiple lacerations and contusions of body parts, surgery and skin graft scars healing by secondary intention. Dependent in all activities being performed in bed, with an external thigh fixator, intimidated, in a crying mood. All the fractures were stabilized, an above-knee endoskeletal prosthesis was fitted and the patient achieved complete independence in most daily activities including overcoming obstacles. Continued her education with good grades, hopeful, cheerful, likes table-tennis and geography, draws well.

A boy, N.J., aged 12, injured by high-voltage electricity while playing with ball: shoulder disarticulation of the right arm, proximal transtibial amputation of the left leg and numerous scars of burns and skin-grafting for covering defects, intimidated, sad. At the beginning of rehabilitation process, the patient was dependent in all daily activities, having wounds in the final phase of epithelialisation and hip and knee contractures of the left leg. All the wounds were treated, full motion achieved, as well as the power of all the body segments, fitted with a cosmetic prosthesis for the right arm and a below-knee endoskeletal functional prosthesis. Achieved a total independence in all daily activities, continued school, plays football, rides a bicycle.

Conclusion: Both children were successfully rehabilitated for independent performance of everyday activities and prosthetic patient and family members education done by all team members gave good results. Follow-up will further show the quality of life and further development of the reckless children.

Key words: Polytrauma, amputation, prosthetic rehabilitation, children

PSYCHOLOGICAL ASPECTS OF CHRONIC PAIN PATIENTS

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Introduction: Psychological factors may play an important role in the onset, severity, exacerbation, or maintenance of chronic pain in rheumatic diseases.

The aim of the study: Analysis of psychosomatic aspects in patients with low back pain (LBP) and rheumatoid arthritis patients (RA).

Material and methods: We examined 120 patients (60 LBP; mean age 48.92 ± 10.42 yrs, and 60 RA mean age 53.92 ± 7.06 yrs). The patients were multidisciplinary examined and treated at Clinic for Medical Rehabilitation, Clinical Center of Novi Sad and at Special Hospital for rheumatic diseases in Novi Sad with standard physical procedures during 4.2 ± 0.5 weeks. We evaluated the pain (Visual analogue scale (VAS), the functional status (Oswestry Disability Questionnaire-ODQ), and HAQ (Health assessment Questionnaire), the psychological profile (Minnesota Multiphasic Personal Inventory- MMPI).

Results: showed the pathological profile in 41 % LBP patients (hypochondria in 16,67%, hysteria in 13,33% patients and depression in 5% patients), and in the 48,33% RA patients (depression in 20 % of patients, hypochondria in 20 %, conversion in 5%). Pain measured by VAS were severe in the both group of patients (LBP, RA) with pathological profile ($p < 0.05$). The intensity of pain was assessed by visual analogue scale was significantly associated with functional status ($p < 0.01$); Both groups with pathological profile showed statistically significant functional limitation than patients with adaptive forms of behavior ($p < 0.05$).

Conclusion: Psychogenic factor often complicate treatment, so the team approach during rehabilitation treatment chronic pain patients is necessary.

Key words: low back pain, rheumatoid arthritis, psychopathology, MMPI

**PRESENCE OF CERVICAL AND LUMBAR PAIN SYNDROMES AMONG WORKERS AT
REGULAR PHYSICAL EXAMINATION**

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Introduction: Cervical and lumbar syndrome are the most common pain syndromes in physical medicine. Both occur in the area of degeneratively changed cervical and lumbar spine with the existing irritation of neurovascular structures. The most common clinical signs and symptoms are the pain and loss of function. Those affect the most productive segment of society and lead to frequent absences from work.

Objective: Physical examinations of the fittest working population are aimed at the prevention, diagnosis and treatment in a timely manner closer to this target group. In this way, physical therapist working with these patients has significant impacts on the socio-economic sphere of society. Special attention is given to present CS and LS as the most common health problems of patients.

Method of work and material: Physical examination included 666 employees of one company in Nis in the period from 22. 10. 2012. to 31. 01. 2013. Physicians in DZ Nis, on the basis of good anamnesis and physical examination, diagnosed health problems with 443 (66.52%) men and 223 (33.48%) women. The men were aged between 30 - 65 and women from 30 - 61.

Results: Of the total number of respondents, the results were normal in 274 (41.14%) of the respondents, ie. at 204 (74.45%) men and 70 (25.55%) women. CS was present in 115 (17.27%) percent of the respondents, LS, 172 (25.83%). Of that number, nearly 55 CS (47.83%) males and 60 (52.17%) women. LS was present in 124 (72.09%) men and in 48 (27.91%) women. Both diagnoses (CS and LS) were present in 19 (63.33%) males and 11 (36.67%) females. At the aggregate level, both diagnoses were present in 30 patients which is 4.50%. Other diagnoses were present in 75 patients out of the total number of which is 11.26% and in 46 (61.33%) males and 29 (38.67%) females.

Conclusion: Painful CS and LS are syndromes which are usually present with the working population. Physical examinations and testing showed that the total number of respondents where the painful LS was present were male, while women suffered from CS. Physicians with proper diagnose and physical therapy play a leading role in addressing these painful conditions. Prevention through discussion and advising the proper way of life and work are indispensable. All the patients were given advice for further examination and implementation of physical therapy.

Keywords: CS, LS, physical examination, physical therapy

CAUTION IN PRESCRIBING PHYSICAL THERAPY

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Introduction: Spondylodiscitis is a localized inflammation of the intervertebral space and the body of vertebra. Two forms are distinguished: primary and secondary. The secondary spondylodiscitis occurs following a surgery for disc herniation, and the literature has described only a small percentage, i.e. 2-3% of all patients who underwent operation.

Materials and methods: The paper presents a case of C.P., 58 years old, who was sent to our hospital having undergone an operative treatment for the prolapsed i.v. disc L4L5 on two occasions. The first operation was in September 2012 after which the physical therapy started which was stopped because of pain, and the second in January 2013, for recurrence of the prolapse. At the first examination in our hospital and after the second surgery with a detailed anamnesis, medical examination, routine laboratory analyses, control RTG, because of the two operations within a relatively short period and the persistent pain syndrome, NMR of the LS spine was proposed and done, which clearly pointed out to the changes in terms of spondylodiscitis L4L5.

Results: For this patient, of course, the rehabilitation treatment was not initiated, and he was referred to an infectious disease clinic despite the *normal standard laboratory analyses*, and after a specific diagnosis: CRP electrophoresis which was substantially higher, as well as other findings described in the paper, consulting a neurologist, a neurosurgeon, and absolute team evaluation, he was referred to a regional hospital for further adequate antibiotic therapy, and according to the treatment protocol, to further diagnostic methods and mode of life. The clinical picture is frequently atypical / followed by the expected findings in laboratory analyses, febrility and other common side effects /.

Conclusions: This case advises for caution in examination, equal importance of detailed anamnesis, diagnostic parameters, and discrete subjective complaints, despite the clinical picture which does not have to be typical, and the great importance of good evaluation, i.e. decision on the type of treatment and the method to implement it.

Key words: Anamnesis, evaluation, additional diagnostics

**REHABILITATION AFTER ARTHROSCOPIC ANTERIOR SHOULDER STABILIZATION –
EARLY EXPERIENCE**

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Introduction: Arthroscopic stabilization of shoulder, being the leading method in treatment of anterior shoulder instability, was introduced in our Institution in the end of 2010. A good outcome of treatment of patients with shoulder instability depends on the good result of operative treatment as well as on timely initiated and well organized rehabilitation.

The aim of the study is to show initial results in rehabilitation of patients after arthroscopic anterior shoulder stabilization.

Patients and methods: By prospective research, we monitored 23 patients after arthroscopic stabilization of anterior shoulder instability within the period from September 2010 to December 2012. Rehabilitation of all patients started on the first postoperative day and was implemented according to valid protocol through 4 stages of total duration of 6 months. Parameters of monitoring were VAS pain scale, range of motion in shoulder joint, Rowe score, Constant Shoulder Score and Oxford Shoulder Score. The results /preoperatively and 6 months postoperative/ were analyzed using Student's t test.

Results: In 17 patients, the outcome of rehabilitation was very good (73,91%), good result was achieved in 4 patients (17,39%), while 2 patient had satisfactory result (8,7%). There were significant differences in all of the parameters of evaluation ($p < 0,05$) except in the range of motion.

Conclusion: Initial experiences encourage and show necessity of rehabilitation after arthroscopic anterior shoulder stabilization which must be initiated in time and implemented professionally by multidisciplinary team approach. There is a need of constant evaluation and as needed the modification of elements of protocol of rehabilitation by the operator and rehabilitation team.

Key words: rehabilitation, anterior shoulder instability, arthroscopic stabilization

MAJOR TRAUMA REHABILITATION

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Introduction: The Walton Centre NHS Foundation Trust (WCFT) along with Aintree University Hospital and Royal Liverpool Hospitals, Liverpool, United Kingdom became the major trauma centre collaborative (MTCC) for the Cheshire and Merseyside region covering population of 2.4 million population from the 11th June 2012. The MTCC aims to provide 24 hour specialist treatment for the most seriously injured (major trauma) patients. The Walton centre being specialist Neuroscience centre, patients with major trauma and neurotrauma are admitted for neurosurgical and rehabilitation care. The commissions included the rehabilitation prescription as the criteria to achieve best care for major trauma patients. An early and individualised, rehabilitation prescription was implemented to outline the rehabilitation needs required by each patient to help maximise their recovery. For each trauma patient we aim to complete a rehabilitation prescription within 48 hours of admission to the hospital.

Materials and methods: We reviewed patients admitted to The Walton centre, with major trauma over last 6 months (October 2012 to March 2013). We looked in to number of patients admitted each month, injury severity score, demographic data, cause of major trauma, average length of stay in hospital and their outcome

Results: Walton Centre received 150 major trauma admissions over these 6 months. 74% of major trauma patients were males. Significant majority (81.3%) had very severe injuries with injury severity score (ISS) more than 15, while 14.6% had ISS of 9-15. Falls was accounted as the most common cause of major trauma (73%), while 16% had Road traffic accidents. In 99.3% of eligible cases we could successfully completed rehabilitation prescription and passport within time. Average length of stay of these patients in our hospital was 15.5 days. 96.7% survived following such severe injury and had successful outcome.

Conclusions: Early findings suggestive of successful delivery of high quality rehabilitation care following Major trauma as per local and national guidelines. Earlier rehabilitation input following major trauma decrease length of stay in hospital and improves the outcome. Our study is ongoing, hoping to present full findings at the conference

Key words: Major Trauma Rehabilitation, Rehab prescription, Rehabilitation passport

TREATING A COMPLEX SHOULDER INJURY – CASE REPORT

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Introduction: Posterior shoulder luxation is a rare injury, hard to diagnose, but it can lead to severe consequences. We will present a case of a man, a dentist, who lost his right leg in a car accident, and due to an undiagnosed shoulder injury, he was subsequently given right shoulder prosthesis. **Materials and methods:** Patient G.I., age 33, was injured in a car accident as a motorcyclist on August 8th, 2011. The patient suffered a poly - trauma (Amputatio femoris lat. dex. traumatica, Fractura ulnae lat. dex. aperta, Luxatio art. Cubiti lat. sin., Contusio ommae lat. dex. St. post shock traumaticam). He was hospitalized in Sabac, where his wound on his shank was sutured and his left elbow was repositioned. Afterwards, he was transferred to Belgrade, to orthopaedics ward at the CCS (Clinical Center of Serbia) where an intervention was performed on his stump and the fracture on his right forearm was operated on. From October 10th until February 28th 2012, the patient was at the Specialized Hospital for Rehabilitation and Orthopaedic Prosthetics where he was given upper leg prosthesis for the right leg and where he tried to rehabilitate his right shoulder, while constantly feeling pains and having limited mobility of the right shoulder. In February 2012, in Banja Luka, he was diagnosed “an overlooked posterior luxation of the right shoulder with a defect in humerus head which is locked in glenoid”. He was suggested a surgical procedure, which was performed in Belgrade on July 1st, 2012. A partial prosthesis of the shoulder joint was placed. The pains were less prominent; however the mobility of the shoulder was still minimal. The patient returned to his birthplace, to Banja Koviljaca, on September 12th 2012, now as a patient with crushed dreams, with pain in his soul much stronger than the one in his body, with the right upper leg prosthesis and with endoprosthesis of the right shoulder. He did not even consider returning to work as a dentist.

Results: At the Specialized Rehabilitation Hospital Banja Koviljaca, a complex balneophysical treatment was conducted, with constant supervision of the CCS orthopaedic surgeons. After only a month of inpatient treatment, first results could be seen in the form of pain reduction and an increase in the mobility of the right shoulder. Afterwards, outpatient treatment is continued and after 6 months since the shoulder surgery, we have achieved outstanding results. Range of motion in the right shoulder significantly improved, the muscles have strengthened, pain syndrome is reduced, and the quality of life has improved according to the SF36 questionnaire. The walk improved and became adequately steady. But the most important result is the fact that the patient is motivated, he has a renewed faith in life, and he has returned to his profession. He hasn't reconciled with the opinion of the Disability committee. He still regularly does physical therapy and hydro kinesis.

Conclusions: With poly-traumatized patients, vital problems are dealt with first. Some conditions may even be overlooked. Although there are contemporary diagnostics nowadays, the patient and their opinions should never be neglected. Properly prescribed and timely commenced rehabilitation can considerably improve the recovery and affect the outcome of the treatment. Pictures speak a thousand words!

Key words: luxation, shoulder joint, balneotherapy, rehabilitation, endoprosthesis

**FORENSIC PHYSIATRIST AS AN EXPERT IN COMPLICATED INJURY OF THE ELBOW
JOINT IN A CAR ACCIDENT**

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Introduction: More traffic participants (drivers, co-drivers, pedestrians, passengers) experiences trauma with lasting consequences. Because of that the trials are more frequent and appointed experts of medical profession are more engaged. Forensic expertise can be accessed after the end of treatment and rehabilitation, so physiatrists as forensic experts are more significant. Municipal Court determined the forensic expertise in the case of AA against the defendant insurance company SS to assess the possible existence of reduction of working ability. The Decision is that forensic expert evaluation determines whether with the accuser AA there is reduced work ability at all, and if there is any in what percent it is.

Materials and methods: After a certain diagnostic procedures (Rtg, EMNG), physical examinations, access to court documents and medical records, protocols of treatment and rehabilitation the opinion was given.

Results: With the accuser AA current situation is practically definitely, improvement should not be expected, injury happened eight years ago (2001.).

Conclusions: Diminished work capacity of the accuser is 15%. It is reflected in the fact that the prosecutor AA is having certain interference during the exercise of the right hand, and will not be able to perform in a satisfactory manner, especially to be affected in the performance of physical work and precise jobs. The Court has fully adopted the conclusions.

Key words: Forensic expertise, the elbow joint injury, physiotherapist, assessment of working ability, the percentage reduction of working ability.

**REHABILITATION AFTER LEG LENGTHENING IN DYSCHONDROPLASTIC PATIENT: A
CASE REPORT**

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We report the case of a 26-year-old patient N. J. with congenital dyschondroplasia. The patient was referred to the Orthopedic Clinic, Clinical Center of Nis in July 2008, due to the lower limb pain, that worsened during prolonged standing and walking, particularly up and down the stairs. After clinical, radiological and NMR imaging, surgical crura elongation was proposed. After the preoperative preparation, on August 7th, 2009, right tibial and fibular osteotomy was performed with an external fixation. Operative and early postoperative course was uneventful, and the patient was trained for the distraction of the apparatus. Elongation of 1 to 1, 5 mm per day began, with the verticalisation and non-weight bearing walking with crutches. On the 9th of December 2009, the identical surgical intervention was performed on the left leg. Early postoperative course was smooth, but on the 4th of March 2010 correction of the left crus position with fibular corticotomy and external fixation had to be done. Since the first postoperative day, the patient was included in an early rehabilitation program, and on two occasions was hospitalized at the Clinic of Physical and Rehabilitation Medicine in Nis, during April and November of 2010, for a total of two months. During inpatient rehabilitation cryo, kinesi, occupational, lasero, electro and medicamentous therapies were applied successfully, as well as pulsed sinusoidal magnetic field, for cortical bone and marrow cavity restoration. The 83 mm crus elongation was achieved, and external fixators were removed eight months after the original application. After fixators' extraction, the outpatient's rehabilitation continued with additional hydro and hydro/kinesi therapies. Despite muscular hypotrophy of the lower extremities and the initially reduced range of motion in both knees and ankles, good aesthetic and functional results were obtained. After the second inpatient rehabilitation, the functional range of motion was achieved in both knees and the right ankle and after outpatient rehabilitation in the left ankle as well, with the enhanced muscular strength. Elongation of the lower limbs in dyschondroplastic patient reduced pain and improved trunk-to-lower - limb proportions. Early rehabilitation treatment was essential for satisfactory clinical results.

Key words: congenital dyschondroplasia, crus elongation, external fixator, rehabilitation

THE IMPORTANCE OF REGULAR REPETITION OF REHABILITATION TREATMENT FOR PATIENTS WITH ARTHRITIDES

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Introduction: Arthritides are chronic degenerative joint diseases accompanied by chronic pain, limited mobility and difficulty in performing daily activities. They present a significant socio-medical problem. The most commonly affected joints are the hip and knee (coxarthrosis and gonarthrosis), given that they endure the greatest stress.

Materials and methods: The paper presents the monitoring of 49 patients in the period of two years. Patients are uniform in all the necessary criteria, the initial VAS, MMT, HTA, DM, and other comorbidity factors.

Results: They were treated with standard procedures according to the protocol/kinesi, occupational, electric, laser, water or cryo, depending on the clinical picture and comorbidities/, and the outcome and length of treatment is controlled through VAS, MMT of the thigh region, as well as the length of rehabilitation. A number of patients is still in the process, but the monitoring so far has given the preliminary result that the average VAS is decreased by a higher percentage as well as in less time with patients who are on *regular* periodic repetitions. It is to be expected that after two years, with aging, the effect of physical therapy is less efficient and the therapeutic response becomes slower. However, the results indicate the opposite, confirming that the repetition of rehabilitation therapy in degenerative diseases is one of the most important requirements for the maintenance of functional status and a better quality of life. I would like to emphasize that the patients who were referred for rehabilitation therapy as preoperative preparation were excluded from the monitoring.

Conclusions: Faster and better effect is achieved in patients who come to periodical repetitions of physical therapy rather than with the first visit.

**OUTCOME MEASURES FOLLOWING SELF MANAGEMENT TO THE KNEE
OSTEOARTHRITIS**

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Background: Knee osteoarthritis (OA) is a painful condition causing disability and handicap. Treatment of knee OA consists of a combination of non-pharmacological and pharmacological approaches. Non-pharmacological approaches include orthoses, exercise, diet and patient education. Even if exercise therapy is a key treatment modality in OA, the optimal content of this treatment has yet to be precisely described.

Aim: The aim of this prospective study was to assess the effectiveness of a self-management program among osteoarthritis knee sufferers.

Methods: This study was carried out on patients having consulted in our rehabilitation department from September 2010 to December 2011 and included 146 patients aged more than 45 years. All subjects received advice and information for the practice of specific exercises at home. Exercise therapy was explained to patients to improve adherence to treatment. Patients were assessed before treatment, after treatment and at each 3 month follow-up. Outcome measures included visual analogue scale VAS pain on walking, VAS pain at rest, range of motion, Western Ontario and Master University Index WOMAC and LEQUESNE index.

Findings: The mean final outcome measurements were taken after 12month of follow-up. The average VAS score for pain at rest dropped from 68 ± 10 to 31 ± 30 . The score for pain during effort fell from 85 ± 13 to 40 ± 30 . In 82% of cases, joint mobility was better at the final assessment. There was a significant decrease of number of unplanned medical consultations. Functional scores were improved. 65% of patients were satisfied. However, functional improvement correlated well with adherence to exercise therapy.

Conclusion: Even when it is done at home unattended, unsupervised and without expensive equipment, self management program may be beneficial for pain and function.

THE EFFICACY OF MAGNETOTHERAPY IN KNEE OSTEOARTHRITIS

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Introduction: The efficacy of magnetotherapy (MT) in knee osteoarthritis (KOA) patients is still questioned. The aim was to compare the short-time efficacy of three-week MT in the randomised and placebo controlled trial in reducing pain, improving physical function and quality of life.

Material and methods: The trial was conducted in 2012 at the IPRM UCC Maribor, Slovenia. Inclusion criteria were clinical-radiologic criteria of American College of Rheumatology, and Kellgren and Lawrence grades I-III. Exclusion criteria were inflammatory rheumatic diseases, knee hydrops, deep venous thrombosis, symptomatic arthrosis of others lower extremity joints, lower back pain and radiculopathy, physiotherapy and intraarticular injections in the last six months. Fifty subjects were randomized in three groups: group A (N = 16; Magus Magnetotherapy, Status, Ljubljana, Slovenia; max. 30 G, 1-21 Hz), group B (N = 14; Quattro Pro, ASA, Italy; 85 G, 20 Hz), and group C (N = 20; fake Magus Magnetotherapy). MT lasted for three weeks (15 sessions for 30 minutes each). The evaluation was done three times: on inclusion (T₀), after the last session (T₁), and three months after (T₂). Primary rehabilitation outcomes were Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Short form 36 v. 2 (SF-36). In the statistical analysis the Wilcoxon Signed Rank Test and Kruskal Wallis Test were used. P value for individual parameter was set at 0,05, and in combination of WOMAC and SF-36 on 0,025.

Results: The mean age of 50 subjects (34 women and 16 men) was 64,3 ys (range 46 - 89 ys, SD 8,5 ys). The mean time of KOA symptoms' duration was 7,9 ys (range 0,4 - 25 ys, SD 6,1 ys). There were no basic statistically significant differences between the groups in subjects' mean age, symptoms duration time, body mass index, WOMAC, and SF-36. The best improvement of WOMAC score and PCS subscore of SF-36 was reached in group B (Quattro Pro MT). The only two statistically significant results in the group C (placebo) were reached in comparing WOMAC pain and stiffness subscores between T₀ and T₂. There were no statistically significant differences in WOMAC and SF-36 between all three groups at T₂.

Conclusions: Active three-week MT on Magus and Quattro Pro devices resulted in statistically significant improvement measured by WOMAC and SF-36. In the placebo group statistically significant improvement was reached only in WOMAC pain and stiffness subscores after three months posttherapy. Statistically significant differences between active and placebo groups at that time were not present. The power of this trial was not calculated. Groups are presumably undernumbered. Placebo effect is rather high, especially in WOMAC pain and stiffness evaluation. Clinical and functional improvement due to MT has to be questioned. Optimal dosing of magnetotherapy is undefined.

Keys words: gonarthrosis, rehabilitation, functional evaluation, quality of life

**INFLUENCE OF REHABILITATION ON FUNCTIONAL STATUS OF PATIENTS WITH KNEE
OSTEOARTHRITIS**

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Introduction. Osteoarthritis (OA) is a common, chronic, degenerative disease. The main clinical manifestations of osteoarthritis are pain, limitation of motion of the joint and the weakening of muscle strength.

Goal. Evaluation of the functional status of patients with knee OA.

Materials and Methods. The study included 56 patients diagnosed with knee OA, mean age 59 ± 5.6 years. The diagnosis was based on X-ray, and in all patients the changes were stage II by Kellgren Lawrence scale. The subjects were divided into two groups. The first group consisted of 30 patients, the other 26. In the first group peloid applications were applied to the individual kinetic therapy to increase range of motion in the knee with strengthening GMS clinical characteristics (resistance exercises). In the second group with the application of peloid and individual Chinese therapy were treated by interferential currents along the thigh. In both groups the same load level. The mobility of the knee was measured by goniometer and expressed in degrees. GMS thigh was measured by manual muscle test. The measurement was done at the beginning of treatment and after 3 weeks. Results obtained were analyzed using Pearson's (Pearson) χ^2 test, Student's t-test.

Results. After three weeks of intensive rehabilitation treatment in both groups of patients there was a statistically significant disparities in knee range of motion; range of motion of 90 ± 5 degrees ($p < 0.05$). GMS thigh in the first group of respondents to grade 3 + -0.75 MMT-in ($p < 0.05$), the second group 4 + -0.25 MMT-in ($p < 0.05$).

Conclusion. Intensive rehabilitation treatment has a beneficial effect on the functional status of patients with knee OA.

Keywords: knee osteoarthritis; functional disability; rehabilitation

TYPE I COMPLEX REGIONAL PAIN SYNDROME - A CASE REPORT

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Introduction: Complex regional pain syndrome was defined as a variety of painful conditions predominantly distal, which exceeds in duration the usual symptoms during a nociceptive event. In 1994, the International Association for Study of Pain (IASP) proposed the subdivision of Complex Regional Pain Syndrome (CRPS), according to the presence or absence of nerve injury: Type I, formerly known as reflex sympathetic dystrophy, Sudeck atrophy or algoneurodystrophia which does not present nerve injury and Type II: causalgia that has evidence of nerve injury. The pathophysiologic mechanism responsible for this syndrome is still unknown. Type I CRPS can develop after mild trauma, immobilization or disuse. CRPS type II may be due to a lesion of the nerve associated with trauma, metabolic disorders or infectious process.

Materials and methods: We performed a retrospective analysis of a medical record of a 25 year old patient admitted in a Neurology Unit with clinical suspicion of Complex Regional Pain Syndrome.

Results: 25 year old patient presents to the ER with persistent localized pain, for 3 months. Pain was referred to the anterior aspect of the right wrist with elbow radiation. Pain worsened when flexing and extending the wrist which led to functional impotence. Physical examination showed oedema of the right hand, excessive sweating, hypoesthesia in the right forearm and stiloradial and bicipital hyperreflexia unilaterally. Phalen and Tinel were negative. Passive and active range of motion was limited by pain. Proximal and distal interphalangeal of the 2nd to 4th finger of the right hand were flexed. She had no history of trauma or fracture. She was then admitted to a Neurologic ward to further diagnostic evaluation. The patient started medication for her arm pain with NSAIDs, corticosteroids and opioids and a rehabilitation program which consisted in electrical transcutaneous stimulation, passive mobilization of the wrist, contrast baths and Ultrassound.

Conclusions: Early diagnosis and recognition of this clinical condition is extremely important to implement a rehabilitation program both for immediate pain relief and to prevent severe functional impairment.

Key words: Complex regional pain syndrome, algoneurodystrophia, rehabilitation

IMPORTANCE OF JOINT ACTION OF KETOPROFEN GEL AND KETOPROFEN DUO CAPSULE IN THE TREATMENT AND PREVENTION OF CERVICAL SYNDROME

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Introduction: Cervical syndrome belongs to a group of degenerative diseases of the spine. It represents health, social and economic problem. It requires a complex physical therapy and rehabilitation.

Materials and methods: The monitoring was done at the Rheumatology Department of "Institute for Physical Medicine and Rehabilitation Dr M. Zotovic" in Banja Luka. The paper describes patient V.B., student, age 25 years. The first symptoms started a few years ago and deterioration occurred four months ago; severe pain in the neck, without irradiation, which increases with movements of the head in any direction. The pain was intense during the night. He was referred to physiatrist three weeks later, after alleviating pain.

At the first examination as subjective symptoms, patient had severe pain in the neck. The clinical examination of the patient had shown intense pain on palpation spinous extensions, enhanced para vertebral muscle tone, limited mobility of the cervical spine.

The next procedures were applied: kinesis, sonophoresis by Ketoprofen gel, hydrotherapy, education of the patient about protective positions of the cervical spine. Drug therapy of Ketoprofen DUO capsules was applied, too.

Monitoring parameters: visual analogue scale of pain (VAS), subjective and on palpation of spinous extensions, PVM tone, and range of motion in the neck. Measurements were performed at the beginning and at the end of the treatment. Evaluation was done with cervical spine test score (CSS).

The first day of treatment: subjective neck pain of high intensity (VAS = 7), clinical findings - pain on palpation spinous extensions extremely high intensity (VAS = 8), PVM amplified tone, decreased range of motion (Sober = 7cm) (CSS = 70).

Results: The results on the twenty - first day of treatment: subjective pain in the neck very low intensity (VAS = 2), pain on palpation spinous episodes of low intensity (VAS = 5), PVM normotonic, range of motion in the neck increased (Sober = 8cm) (CSS = 25)

Conclusions: The application of the combined action Ketoprofen gel capsules and Ketoprofen Duo has given good results in the treatment of cervical syndrome. Therefore, it is useful in the prevention of this disease.

Key words: cervical syndrome, rehabilitation, KETOPROFEN-gel and capsules

**HYDROSYRINGOMYELIA IN AN ANKYLOSING SPONDYLITIS PATIENT AFTER
STABILIZATION SURGERY**

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Introduction: Ankylosing Spondylitis (AS) is a chronic, systemic, and autoimmune inflammatory disease which mainly affects axial skeleton. It causes rigidity and changes in the biomechanical features of the spine as a result of progressive ossification of the spinal disc, ligaments and ankylosis of the facet joints. In this article, a hydrosyringomyelia case after stabilization surgery is presented.

Case: A 48 - years old woman was admitted to our outpatient clinic with a complaint of numbness, burning pain and gait disturbance in her right leg. She had a medical history of ankylosing spondylitis for 15 years and had underwent stabilization surgery due to bad posture 7 years ago. She complained of numbness starting from her waist, spreading to both her legs and burning pain for the last 1.5 years. The patients complaints increased despite medical treatment. Magnetic resonance imaging of the spine revealed a cystic lesion of the spinal cord at the T8-T9 level with concordant with intramedullary astrocytoma. Also hydrosyringomyelia of 1 cm width at the T10-L1 vertebra levels was detected. At follow-up, she underwent T8-T9-T10 laminectomies, mass excision, syringotomy and duraplasty, and pathology result of the excised material was compatible with fibro - osseous lesion. After operation; numbness, burning pain and gait disturbance in her right leg continued. In her physical examination, the patient was assessed as T10 AIS D and was included in a rehabilitation programme. At the end of rehabilitation programme, she was discharged ambulatory on flat ground and under supervision with a single point cane.

Conclusions: Despite current approaches in ankylosing spondylitis treatment, the disease frequently causes to bad posture due to its progressive course and leads to many secondary problems as well as reducing the patients' quality of life. In treatment of bad posture, many surgical procedures like decompression, stabilization and spinal fusion are used. Many surgical procedures including decompression, stabilization and final fusion could be performed for the treatment of bad posture. In our case spinal cord injury secondary to syringomyelia was detected 7 years after stabilization surgery. Hydromyelia and syrinx are the terms used to define dilatation in central spinal cord. Syringomyelia arises from various primary problems like caudal fossa (chiari malformation), trauma, and spinal canal tumours. Some authors reported syringomyelia progression related to spinal operation. It should be kept in mind that syringomyelia, which is a rare complication, may develop in patients who underwent stabilization surgery.

Key words: Ankylosing spondylitis, syringomyelia, stabilization surgery

ORAL MOTOR ABILITY OF PATIENTS WITH LESIONS RIGHT HEMISPHERE AFTER STROKE

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Introduction: Stroke often causes disturbances of oral motor skills which results in the appearance of speech and language disorders, particularly in patients with left-sided brain damage. For most people the centers responsible for speech and language function are found in the left hemisphere. Right hemisphere is in a minority of people the dominant for speech and language, and its damage does not significantly distort the function, except in patients with a dominant speech and language centers in this hemisphere. Impairments in the execution of speech movements can be disrupted in size, speed, strength and time.

Materials and methods: We tested the ability of oral skills of patients after damage to the right hemisphere of the brain caused by stroke, without the presence of significant speech and language disorders on a sample of 60 patients during the first 3 months in 2013. Patients were analyzed by sex, age, type of stroke lateralization of neurological deficit. Oral skills were tested with subtest of Boston Diagnostic Aphasia Examination (BDAE).

Results: Average age of the sample was 64.33 years ($\pm$ 11.35) with a range of 35 to 84 years. It is interesting that 35.0% of the sample were 60 years or younger. Male gender represented in relation to women (55.0% : 45.0%). The most common was ischemic stroke at 66.7%, the intracerebral hemorrhage with 13.3%, with 1.7% of subarachnoid hemorrhage, and data were unknown for 18.3% of the sample. All patients after stroke had left-sided neurological deficits. Most patients had not significant speech and language impairments. Nonverbal subtest agility is realized with an average of 78.78% success; verbal skill with 83.57% success; subtest speech automatisms with 78.25% success. Subtests of chanting, singing and rhythm average realized with 69.16% success. The results achieved are below the norms prescribed BDAE, but significantly better than in our previous study in patients with left-sided brain damage, that is right-sided neurological deficits to the body. On the test of non-verbal agility none of the patients with right-sided brain damage had achieved a result of lower than 50% of the maximum possible result, and the result of 75% or more was achieved in 70% of the sample. A score of 90% or more was achieved in 30% of the sample. In the test of verbal skills only one patient had a score of less than 71.42% of maximum possible achievements; a score above 90% of the test had 26.7% of patients.

On the speech automatisms test none of the patients achieved lower results than 50% of the maximum possible result, and the result of 75% or more was achieved 63.3% of the sample. On the recitation, singing and rhythm test 23.3% of the sample had a score of less than 50%. Our earlier study of patients present with speech and language disorders following stroke, where most of the patients with right-sided neurological deficits were represented by 87.7%, following results were achieved: the verbal subtest of skill achieved an average score of 45%, verbal dexterity of 48, 57%; speech automatisms of 54.12% and chanting, singing and rhythm 39, 66% success.

Conclusions: Research confirms the dominance of the left hemisphere in speech language function, and the presence of oral motor disorders with right-sided brain damage.
Key words: stroke, oral dexterity, damage to the right hemisphere, speech and language disorders

ABILITY TO WRITE IN PATIENTS WITH SPEECH AND LANGUAGE IMPAIRMENTS AFTER STROKE

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Introduction: Stroke in a significant number of patients has resulted in the appearance of speech language impairments (SLI). For most people the dominant role in speech language function within that function and writing has left cerebral hemisphere. Damage of the left hemisphere arises SLI and contralateral neurological deficits. In most patients with significant SLI there has been damage to modality of written expression. Writing is a complex process that incorporates a multitude of cognitive, linguistic, perceptual, and motor processes. Agraphia or acquired dysgraphia is an impairment or loss of the ability to write caused by brain damage of different etiology in patients who have previously gained the ability to write.

Materials and methods: We tested the ability of writing in 123 patients with ongoing SLI caused by stroke, from July 1st. to Dec.31st 2012 in IPMR "Dr Miroslav Zotović" in Banja Luka. Analyzed by sex, age, type of stroke, neurological deficit and lateralization of body. Writing ability was tested with subtests of Boston Diagnostic Aphasia. Testing was conducted during the first 90 days after stroke.

Results: Average age of the sample was 66.35 years. 28.5% of the sample was 60 or younger. The gender structure of the sample was 52.8:47.2% in favor of males. The sample included 78.9% of patients with ischemic stroke, 8.1% of hemorrhagic stroke and others. The most frequent were patients with right-sided neurological deficits (71.5%), right-sided (26.0%) and bilateral (2.4%). Average number of days from stroke to testing was 35.72 days. There were 8 illiterate patients in the sample (6.5% of the sample). Of 125 patients who previously knew how to write, 67% of patients have lost the ability to write and 33% did not. Of 88 patients with right-sided neurological deficits of the body, five were illiterate and in the other 83 patients the ability to write was absent in 79.99% of this category. Of the 32 patients with left-sided neurological deficits three were illiterate and in the 29 remaining the writing ability was present in 82.75% of this category of patients.

Of the patients with right-sided neurological deficits of the body the success of the test in dictated words was 20.12%. In dictating of sentences and narrative writing 81.92% of the patients were unsuccessful. Patients with left-sided neurological deficits of the body in dictating words have successfully solved 82.75% of the test. 31.03% of the patients were unsuccessful in the dictation of sentences test, and 27.58% were unsuccessful in narrative writing.

Conclusions: Research confirms the dominance of the left hemisphere in speech language function, both in oral and written modality. Most patients with right-sided neurological deficits (left-brain lesions) and present SLI, had impairments the modality of writing. Most of the patients with left-sided neurological deficits bodies (right-sided brain lesions) and present SLI, retained the ability to write.

Key words: stroke, agraphia, writing ability, speech and language impairments

SPEECH REPETITION ABILITY AFTER STROKE

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Introduction: Left hemisphere stroke often causes speech and language difficulties. One of difficulties is repetitive speech.

Materials and methods: We compared the ability of repetitive speech in patients with speech and language difficulties after stroke with the side of the body that was damaged by stroke. The sample consisted 123 patients who were tested from June to December 2012, during the first 90 days after stroke. The sample was analyzed by sex, age, type of stroke and lateralization of neurological deficit. Repetitive speech was tested by Repetition Subtests of Boston Diagnostic Aphasia Examination (BDAE).

Results: The sample of 123 patients who were included in speech and language assessment and treatment had an average age of 66.35 years. 28.5 % of the sample had 60 years or less. There were more males than females in the sample (52.8: 47.2%). The most common stroke types were ischemic (78.9%) and hemorrhagic stroke (8.1%). Most patients had right - sided neurological deficits of the body and left hemisphere lesions (71.5%), right hemisphere (26.0%) and 2.4% bilateral lesions. On average, patients were tested 35.72 days after stroke and 50% of the sample was tested in the first 25 days after stroke. 68.3 % of the sample had significant speech and language impairments and therefore were included in speech and language therapy. Success at the word repetition subtest was 76.99 %, at high probability sentence repetition subtest 70.93 % and at small probability sentence repetition subtest 66.87 %. There is not significant correlation between the number of days from onset of stroke, age of the patients and the success of all subtest. Patients with left-sided neurological deficits of the body achieved better results at high probability sentence repetition subtest than patients with right-sided neurological deficits of the body (94.92% : 61.22%). Patients with left - sided neurological deficits of the body achieved better results on word repetition subtest than patients with right-sided neurological deficits of the body (98.75%: 68.29%). Patients with left-sided neurological deficits of the body achieved better results at small probability sentence repetition subtest than patients with right - sided neurological deficits of the body (89.84%: 57.38%).

Conclusions: Better achievements on repetition subtests in patients with left - sided deficits indicate a minimal damage to speech and language centers, while worse achievements of patients with right-sided neurological deficits indicate significant damage to centers responsible for speech and language functions. The relatively high success on all sub-tests (between 57-68%) provide the ability to use repetition in planning the initial speech and language treatment of stroke patients.

Key words: stroke, repetition, speech and language impairments

APHONIA – A DIAGNOSIS CHALLENGE

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Introduction: Functional voice disorders are common and include conversion aphonia/dysphonia, habituated hoarseness, vocal abuse syndrome, postoperative dysphonia. The development of conversion aphonia, also referred to as a psychogenic dysphonia, may result from a temporally related psychologically/emotionally traumatic event. Conversion disorder is an exclusion diagnosis in which symptoms are not intentionally produced or feigned by the patient. The patient's vocal quality is usually hypofunctional or aphonic. Below, we present one case study to illustrate the current challenges of diagnosis of conversion dysphonia.

Case Report: A 43-year-old woman, pharmaceutical technician, was observed in April 2013 referred by primary health care for voice rehabilitation. She had no surgery history and had medical history of asthma and tobacco (20 pack year smoking history and in cessation tobacco program 1 month ago). She was only medicated with simvastatina. In January 2013 she presented acute onset of aphonia, on short and long-run sentences, without others symptoms. It was excluded recent upper respiratory infection, vocation (ie, singing, athletic coaching) and misuse of the voice.

In the initial assessment she had normal neurologic exam with cough and deglutition reflex present. Oropharyngeal exam and pulmonary analysis revealed normal exhalation before phonation and normal chest excursion. Voice Handicap Index scale scored 84 points (total 120 points). In an additional work-up hormone (TSH, T4 and T3 hormone levels) were taken and showed normal levels. She initiated speech therapy (ST) with auditory feedback, head positioning, laryngeal massage, and relaxation. She was referred to otorhinolaryngology and had done laryngoscopy that demonstrated diminished vocal cord adduction during speech. Based on symptoms and clinical history, it was established the diagnosis of conversion aphonia precipitated by anxiety due to recent initiation tobacco cessation program. She was medicated with alprazolam 1mg twice/day and was referred to Psychiatry. Within 3 weeks of ST, she improved the symptoms, had occasional aphonia worsening in end of the day, and scored in Voice Handicap Index scale 59 points.

Conclusions: Aphonia/Dysphonia conversion disorder is an exclusion diagnosis. It's a diagnosis challenge, particularly if there were no psychiatric/emotional history. A complete medical examination should be completed to rule out any possible organic or neurologic cause.

Flexible endoscopic evaluation reveals vocal folds adduct during coughing, laughing, etc..., but not during communicative speech. Therapy addressing the underlying emotional and psychosocial issues should be taken: pharmacological treatment has been reported with tricyclic antidepressants however its efficacy has been reported only after 8 weeks. As this case illustrates speech therapy can improve and optimize voice management particularly in the acute phase.

Key words: Aphonia; Speech Therapy; Conversion disorder

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**EFFECT OF LOWER URINARY TRACT SYMPTOMS ON QUALITY OF LIFE IN PATIENTS
WITH MULTIPLE SCLEROSIS**

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Introduction: Normal lower urinary tract function depends on neural integration between the peripheral and central nervous system. Multiple sclerosis (MS) may cause neurogenic lower urinary tract dysfunction (NLUTD). Percentage variables between 50% and 90% have been reported in the literature. Overactive bladder, combined with urgency, frequency, nocturia and urge incontinence is the most common syndrome. Sometimes voiding dysfunction and urinary retention are leading symptoms. NLUTD represents severe limitation in daily activity and quality of life. A good understanding of negative effects of urinary symptoms on quality of life of patients is important to optimize treatment. So the aim of our study was to determine the impact of lower urinary tract symptoms (LUTS) on quality of life in patients with multiple sclerosis.

Materials and methods: Enrolled were 22 patients aged 36 to 66y, 18 women (mean age 49.4y, SD 8.1) and 4 men (mean age 50.7y, SD 8.1). Patients completed SF-36 and Qualiveen – short form questionnaire. The history of LUTS was taken.

Results: Health related quality of life was in all SF-36 domains below norm based. Urinary symptoms had substantial impact on quality of life. LUTS significantly correlated with role emotional domain of the SF-36. There were no significant correlations between SF-36 domains and Qualiveen – short form questionnaire.

Conclusions: LUTS have negative effect on quality of life in patients with multiple sclerosis. Due LUTS emotional role is mostly affected.

Key words: multiple sclerosis, lower urinary tract symptoms, quality of life

CHEMICAL NEUROLYSIS WITH PHENOL: CASE REPORT

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Introduction: The chemical neurolysis is the percutaneous injection into the nerve or muscle of a chemical agent (phenol, alcohol, or botulinum toxin - BT). This therapy aims at reduction of focal spasticity that interferes with the rehabilitation program or with the functionality. It may also provide pain reduction.

This paper aims to demonstrate the benefits of using phenol 6%. Phenol is a neurolytic agent. It's a non selective agent and the degree of destruction is directly correlated with the concentration and the amount used. It causes the destruction of the myelin sheath of the fibers, with preservation of the endoneurial tube. There may be some axonal destruction. It interrupts nerve conduction and the reflex arc, decreasing muscle tone. It is indicated in motor nerve neurolysis. It has many advantages such as low cost, immediate decrease in muscle tone, high power and long term effect. Adverse effects are rare but have to be taken into account: temporary soreness at the injection site, dysesthesia and tissue fibrosis.

Clinical case: Male, 64 years old. He suffered an ischemic stroke (right middle cerebral artery) at 30/07/2009, with installation of left hemiplegia. Admitted to a Rehabilitation Center during the following periods: 18/11/2009 to 25/01/2010, 27/03/2011 to 07/05/2011 and 04/06/2012 to 07/07/2012. During the second hospital stay, infiltration with BT was made to the left upper limb (subscapularis, pectoralis major, biceps brachii, triceps brachii and brachioradialis muscles).

Oral anti - spastic: baclofen 25 mg, tizanidin 6 mg.

At the last inpatient admission:

Left Upper Limb: muscle strength grade 0. Spasticity grade 4 (Modified Ashworth Scale).

Shoulder: anterior elevation: 0°, lateral elevation: 40°, external rotation: 45°.

Elbow: flexion: 90°, extension: -45°, painful.

During hospitalization an infiltration with phenol 6% was made in the musculocutaneous (1 ml) and the pectoralis lateral nerves (1 mL). After neurolysis it was possible full elbow extension and a lateral elevation of 90°, painless, facilitating the dressing/undressing and hygiene care. The infiltration points were identified by electrical stimulation at 0.7 mA.

The procedure went without immediate complications and there were no side effects.

Conclusion: The chemical neurolysis with phenol is a valid therapeutic option for patients with focal spasticity. It is a safe and effective technique that is characterized by a low cost and with immediate results. It has special relevance in nerve neurolysis of major muscle groups since these muscles easily reach the maximum dose of BT without the desired results. Note that the simultaneous use of phenol and BT is a viable option. This way, we can provide an appropriate and effective rehabilitation program to our patients with less pain, facilitating the hygienic care and providing greater autonomy in activities of daily living.

Key words: Phenol, neurolysis, stroke, spasticity

ACUTE INTRATHECAL BACLOFEN WITHDRAWAL: CASE REPORT AND A BRIEF REVIEW OF TREATMENT OPTIONS

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Introduction: Baclofen is considered to be the drug of choice for treating spasticity of spinal and cerebral origin. Oral baclofen does not effectively cross blood - brain barrier. The precise mechanism of action of baclofen as a muscle relaxant and anti - spasticity agent is not fully understood however it reduces increased muscle tone, Babinski sign, tendon reflexes, ankle clonus and sometimes decreases muscle force.

Patients who fail to respond to oral baclofen or who have significant side effects at therapeutic doses of oral baclofen can benefit from Intrathecal baclofen (ITB) delivered by a programmable implanted drug infusion system.

ITB pump has been used effectively with increasing frequency in patients with severe spasticity. It is implanted in the lower abdomen and dispenses medication from its reservoir through a silicon catheter into the thoraco - lumbar region intrathecally.

Mechanical drug delivery systems provide certain therapeutic advantages, but human errors or device malfunctions can occur. Either can cause drug over - or underdosage or the sudden cessation of drug administration. Symptoms of ITB withdrawal most often are limited to return of the patient's baseline spasticity and rigidity. Abrupt withdrawal can simulate several conditions like autonomic dysreflexia, malignant hyperthermia, serotoninergic syndrome, sepsis, meningitis or neuroleptic-malignant syndrome. In a minority of patients, the sudden withdrawal of ITB caused a life threatening syndrome. Exaggerated rebound spasticity is the earliest symptom and can be associated with tachycardia, fever, labile blood pressure or hypotension and seizures or diminished level of consciousness.

Materials and methods: Case report of a 41 years old man who developed a ITB withdrawal syndrome. The authors also included a literature review. We searched on PUBMED and ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION databases using the keywords "intrathecal", "baclofen" and "withdrawal" to identify studies (published up to December 2012) that focused on presentation or treatment of acute withdrawal state in ITB therapy.

Results: The man has a past medical history of C7 neurological level spinal cord injury secondary to trauma 14 years ago and implemented a baclofen pump 10 years ago. A couple of hours after the pump substitution, he developed hyperthermia, hypotension and tachycardia, neurological impairment, acute renal failure and multisystem organ failure leading to a full - blown intrathecal baclofen withdrawal syndrome.

Pump analysis on the day after revealed that there was no catheter or pump failure but it was identified a catheter refill-programming error.

He was treated effectively with supportive care, high - dose benzodiazepines and reinstitution of baclofen pump.

Conclusions: The episodes of intrathecal baclofen withdrawal are mostly caused by preventable human errors during the surgical procedure and pump programming or pump malfunction. Therefore we suggest that a checklist procedure should be created and used as a guide in order to don't fail any of the steps that ensure a correct refilling of baclofen pump. Oral baclofen replacement may not be an effective method to treat or prevent intrathecal baclofen withdrawal syndrome. The increase frequency of intrathecal baclofen use on severe spasticity should raise the clinical suspicion given to these clinical features.

Key words: Baclofen pump; spasticity; intrathecal; withdrawal

OMISSIONS AND ERRORS IN THE TREATMENT OF SCHOOL CHILDREN WITH FLAT FEET

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Introduction: Flat feet (FF) are common in pediatric practice, characterized by a lowered arch. The most common subtype is flexible FF. In most cases it is physiologic, asymptomatic condition which improves with age in the first decade of life. Sometimes causes symptoms and functional problems with the progression of the foot deformity and the treatment is necessary. Modern algorithms for examination of the FF deformity, allow proper choice of treatment.

The aim of this cross-sectional study was to determine in school children the frequency and severity of FF deformity, symptoms and dysfunction and analyze the therapy, with giving specific guidance for future medical practice.

Materials and methods: 236 pupils aged 7-12 years were undergone the test FPI-6. Those diagnosed with flat feet have been systematically clinically examined. We followed the degree of foot deformities by gender, age, BMI, symptoms and dysfunctions, associated deformities of knee, hip and spine. Data were analyzed according to the total number of FF. All statistical analyzes were performed with SPSS version 19.0.

Results: ¼ of of children has no symptoms or dysfunction. Symptoms are in 37% of the children, of which 16% without dysfunction. In 59% of children there are functional dysability. With age, children with FF have a higher frequency of symptoms and intensity of pain. Symptoms are more common in underweight and obese children. Half of the children with skew foot have symptoms. The pain is localized in the foot 52%, lumbar spine here are 18% children with painful feet, 70% of them have an easy pain, 30% moderate pain, neither one severe pain. Foot pain was mostly localized in the heel and sole (by 26.5%), and in the area of the accessory navicular bone 18%. Children with painful knees had significantly heavier deformity of rear part of the foot. Foot injuries and a tendency to fall are reported in 21% of children, and their deformity was significantly heavier. Children with pain in the lower back in 66% reported about foot trauma, the non-parametric Spearman correlation test indicates medium degree of correlation between lower back pain and trauma ($r = 0.328$, $p = 0.003$). Children with painful FF in 43% of cases were treated with foot orthotics, and their deformity was significantly heavier than the untreated children. 57% of children with symptomatic FF is not treated. 10% of children without diagnostic criteria for pathological flexible FF were treated with orthotics.

Conclusions: this study points the alarming fact: unsystematically history taking and failure to implement a standardized clinical examination in today's medical practice leads to a faulty diagnosis and inadequate treatment in thirds (32.5%) of children with FF, imposing urgently need for establishment a national algorithm in clinical examination, diagnosis, and treatment for FF, with evidential databases to allow the proper choice of therapy, monitor therapy effects and evolution of foot deformity.

Key words: Children, flat feet, errors, treatment

**THE MOST FREQUENT DEFORMITIES OF MUSCULOSKELETAL SYSTEM IN
PRESCHOOL CHILDREN**

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Introduction: The most frequent appearance of physical deformities of children in preschool, can occur in the lower extremity, in the sense of losing normal, physiological vault of the foot – flat feet (pedes plana)

The aim: To present level of presence physical deformities of children in preschool

Method: Systematic review of medical physiologist in the department of Physical medicine and Rehabilitation in the Health Home in Nis in the period of school year 2012/2013 were included 2680 children, girls 1350 (50.37%), boys 1330 (49.62%).

Results: Specialist examination musculoskeletal system of children aged six years detected the functional changes and the different degree of deformity. The most frequent is deformity of flat feet

total of 1728 (64,47%) children. Out of that number girls were 933 (53.99%) and boys were 794 (45.94%). Endemic display, according to place where live, children from urban areas 1292 (74,76%), children from village areas 435 (25,17%).

Conclution: Children in preschool, flat feet presents the most frequent deformities musculoskeletal system. Becouse of consequences in older age, who can appear in the form of disorder of functions of the joints: knees, hips and spine. Their timely discovery and correction is very important.

RESPIRATORY REHABILITATION PRETERM NEWBORN - CASE REPORT

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Introduction: A preterm newborn child is born before the 37 weeks of gestation. Complications that most commonly occur in these children were from the respiratory system and are manifested as respiratory distress or bronchopulmonary dysplasia. Afebrility child's, respiratory rate below 60/min., $\text{SaO}_2 > 95$, the absence of intracranial hemorrhage were prerequisites that must be met to start a respiratory rehabilitation. With the procedures of respiratory rehabilitation in premature newborn starts while the child is in an incubator.

We present a case of a newborn, gestational age 31 weeks born emergency Caesarean section in the second pregnancy complicated gestational diabetes mellitus. Body weight at birth was 1650 g and Apgar scores 5/7. The child was 18 days in the intensive care unit in respiratory support, 10 days in a mode of mechanical ventilation was applied and 8 days HOOD oxygen therapy.

Respiratory rehabilitation is started, by the stabilization of general condition, included gentle massage of the chest, turning on side and exercises for the chest expansion. Respiratory rehabilitation program was carried out twice a day. On the tenth day, the child is separated from the ventilator. HOOD oxygen therapy was continued and started intensive physical treatment using the aerosol therapy, chest massage, positional drainage and breathing exercises. The child was dismissed after 31 days of hospitalization with satisfactory gas analysis in good condition.

Conclusion: Use of respiratory rehabilitation with the premature newborn intensive care and treatment measures improve recovery of these small patients.

Keywords: preterm newborn, rehabilitation, respiratory support

THE MEASUREMENT OF SEGMENTAL COLONIC TRANSIT IN CHILDREN WITH BOWEL BLADDER DYSFUNCTION

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Introduction: The International Children's Continence Society had recently proposed the term "bowel bladder dysfunction" (BBD) to be used instead of the term "dysfunctional elimination syndrome" describing the children with a combination of functional bladder and bowel disturbances. Children with BBD complain of urinary frequency and incontinence, non-monosymptomatic nocturnal enuresis, voiding dysfunction, recurrent urinary tract infections and chronic constipation. It is relevant to identify bowel dysfunction because it has been shown that treatment of constipation significantly reduces lower urinary tract symptoms. Two different types of chronic functional constipation have been identified in children based on colonic transit time (CTT) measurement: a more generalized and severe form known as slow-transit (ST) constipation and a segmental type known as functional fecal retention (FFR). Both entities present with similar symptomatology but involve different pathophysiological mechanisms and require different treatment strategies. Therefore, the aim of the study was to evaluate the types of constipation according to the CTT in children with BBD, and to compare the results with transit type in children with chronic functional constipation without voiding dysfunction (constipation group) and children with normal bowel habits (control group).

Patients and methods: One hundred and one children were included in the study and their medical histories were obtained. Physical examination including a digital rectal examination was performed, together with the measurement of rectal diameter by transabdominal ultrasound and radionuclear transit scintigraphy. Children with BBD additionally kept a voiding diary, and underwent urinalyses and urine culture, ultrasound examination of bladder and uroflowmetry. In order to evaluate the transit pattern, colonic scintigraphy was performed in all children according to a standardized protocol. The radiopharmaceutical was prepared by adding diethylene-triamine penta-acetate labeled with 99m-Tc pertechnetate to granular carbon and administered orally. Sequential images of the abdomen were taken at 4, 8, 24, and 48 hours after ingestion. Segmental colonic transit was analyzed visually and semi-quantitatively by calculating the geometric center from the different anatomic regions of the colon. Patients were categorized as having either slow-transit (ST), functional fecal retention (FFR) or normal transit. Results were compared between the groups.

Results: FFR was diagnosed in 31 out of 38 children with BBD and 34 out of 43 children in the constipation group. ST was found in 7 children with BBD, compared to 9 children in the constipation group. The control group children demonstrated normal colonic transit.

Conclusions: Colonic scintigraphy should be considered in chronically constipated children who failed conventional treatment. It allows accurate assessment of segmental colonic transit. FFR was diagnosed in most children with BBD. However, some children suffered from ST constipation. The differentiation between these two types of constipation is clinically significant because they require different treatment.

Key words: dysfunctional elimination syndrome, colonic scintigraphy, constipation, functional fecal retention, slow-transit constipation

PHYSICAL THERAPY IN PATIENT WITH ARTHROGRYPOSIS - CASE REPORT

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Introduction: Arthrogryposis presents congenital anomaly with various degrees of limbs affection and contractures. The purpose of this study is to present patient admitted after birth and was included into continous physical therapy in hospital and rehabilitation centers for the porpuse of contracture solving, orthopedic treatment and functional recovery.

Material and Methods: The child was trasnfered from Obstetrical clinic in 6th day of life. Neruological and clinical examination was preformed as well as X ray of upper and lower limbs, ultrasound of central nervous system and abdomen, as well as electromyography. The patients was included into physical therapy with regular check-up of functional status.

Results: Clinically on admission there were contractures in joints on both upper and lower limbs, muscle hypotrophies and hypotony with opistotonus and clubfoot. Radiographic evaluation revealed clubfoot and right hip luxations. ECHO revealed no associated anomalies. Electromyographic evaluation revealed reduced number of motor units with signs of neuropathic changes in evaluated muscles on limbs, especially on upper limbs. At the beggining of treatment thermo and kinezi therapy was induced with splints, while in later stages electrotherapy, hidrotherapy, occupational therapy were additionally added with stimulation of motoric development. On latest check-up, child age of 3 years, after complete orthopedic treatment of hip luxation and clubfoot deformity, patient is able to walk independently with reduced movements in upper limbs but educated to perform simple tasks associated with upper limbs.

Conclusion: Arthrogryposis is complex congenital anomaly with heterogenous clinical expression leading to severe handicafe and normal mental development, thus demanding continuous treatment and follow-up untill the end of growth and development in order to achieve maximal functional recovery and independence in performing of daily tasks activities. It is important to stress out that favorable results could be achieved only with team work of physiatrists, physiotherpists, orthopedic surgeons, psychologists, social workers and parents.

Key words: arthrogryposis, physical therapy, children

SY ELLIS-VAN CREVELD

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Introduction: SyELLIS-VAN CREVELD (EVC) is also called chondroectodermal or mesoectodermal dysplasia (but this names do not define the entity enough and they are not satisfactory for general use). The EVC represents a rare genetic disarangement like skeletal dysplasia. It is an autosomal recessive inherit and frequency is 1 to 60 000 newborns but in some isolated human populations is more common and frequency can be until 13 %. Sy EVC is caused by mutation of EVC gene on short arm of the 4th chromosome (4n16). The frequency is same at boys and girls. Pathophysiological is the notised disorganisation of hondrocits in ephiphysis zones where long bones grow and also in central physeal zone where vertebres grow. Clinical signs of EVC are skeletal deformations and heart defects. The concequences of cardiovascular problems can cause that in early childhood in 50% of cases and the ones that survive have a normal life and by the most of them level of intelligence is normal. Sceletal deformations are also noticed such as: disproportionante dwarfism with an average growth from 109 cm - 155 cm, acromesomelic, progressive distal shortening of extremites, axial deformities of limbs, genu valgum, polydactylia is mainly present on hands and in 10% of cases on feet, distal and medial phalangs are shorter than proximal, nails are hipoplastic or completely absent, diferent types of carpal fusion, lumbar lordosis, low-set shoulders, narrow torax with short and also narrow ribs (this can very often cause respiratory problems) deformites of teeth and malocclusion, oral lesions... We rearly meet problems such as: genitourinary anomalies, CNS anomalies, mental retardation, congenital lack of bile duct. Because of complexity of the problem, team theatment is necessary (clinical geneticis, pediatrician , pulmonologist, cardiologist, orthopedist, physician, dentist, phychologist ...etc).

Purpose: of our work is to present you an 18-years old girl with Sy EVC.

Methods: This girl have had from her early childhood until now a lot of orthopedic corrective operations (in our country and also abroad). After all this operations the medical thretment is taken. Three medical threatments have been taken in our institution.

Results: We want to inform the public with this rare disease, to show direction of disease and orthopedic threatment and as well as results of balneo physiotherapy threatment.

Conclusions: We cann all make a common conclusion that continuiously and intensive physical threrapy threatment is necessery.

Key words: Sy Ellis - van Creveld

REHABILITATION OF A BOY WITH PRADER WILLY SYNDROME

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Introduction: Prader Willy syndrome is rarely appeared, it is caused by lack of genetic material on fifth chromosome. The most often symptoms of PWS are: muscular hypotonic, extreme hungriness, growth of weight between age 1 – 6, thin face, almond shaped eyes, small mouth with thin upper lip and slouch ends, incomplete sexual development, retardation, small growth, small palms and feet, speech problems.

Materials and methods: 13 years old boy, treated in our Institution for few times because of retarded psychophysical development. The boy is from second, regular pregnancy, birth in term, immediately after birth he was cured on intensive treatment ward of pediatric clinic in Banja Luka, because of cyanogen crisis and surgery of left kidney because of hydronephrosis. He was released as flabby baby. In age of eight months because he had often pneumonias and expressed flabbiness he was admitted at Institute for child and mother in Belgrade, where the examinations were done and diagnosis was verified. He started to walk in the age of 5 years, in this period his chewing was improved and he started to drink from a glass. Micturition control was not established. In the work with the boy, multidisciplinary approach was applied; he was treated by the special pedagogue, speech therapist, psychologist and he was categorized as moderate mental retardation. Apply of hormone of growth was proposed, but parents refused. On the examination the boy doesn't cooperate, adipose, low growth, palms and feet small, short torso. Independently mobile with stand by full feet, extended knees on wider base. The boy performs crouch and upstanding partially, sits independently with kyphosis of the trunk, he crawl on buttocks, occasionally he stand on his knee and hands, backbone kyphotic, shoulders in protraction.

Results: The boy was included in rehabilitation program / treatment due to Bobath concept (the mother was trained) what resulted with crouching and better walk.

Conclusions: As conclusion we may say that rehabilitation is long term process and it may help to the children with PWS.

Key words: Prader Willy syndrome, rehabilitation therapy

DRAVET SYNDROME

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Introduction: Dravet Syndrome (DS) is a rare and severe form of infantile - onset epilepsy whose main distinctive feature is that seizures are precipitated by fever. Seizures tend to present at around 6 months of age, with multiple seizure types and convulsive status epilepticus; episodes are frequent, often monthly and refractory to some medication. Children with DS are developmentally normal until onset of seizures. Some individual factors like genetics, frequency of seizures and age at onset seem to be correlated with the degree of developmental impairment. In 85% of the patients, a SCN1A mutation can be identified; the subsequent sodium channel dysfunction may confer a unique profile of brain vulnerability to the brain.

Our aim is to report a case of a child with DS, focusing on treatment and the role of Rehabilitation and Physical Medicine.

Materials and methods: To date, no single drug has proved to be effective in most patients. Valproic acid, levetiracetam, zonisamide and topiramate have shown positive effect; phenytoin, carbamazepine and lamotrigine have proved that can worsen seizures and should be avoided. In two class I trials (phase III), the association of stiripentol with valproate and clobazam has had good results. Alternative approaches have not been systematically studied yet. Outcome is poor, with progressive disturbance in cerebral function in most patients (epileptic encephalopathy) and ongoing seizures. Seizures persist into adulthood as brief nocturnal convulsions and a characteristic deterioration of gait.

Results: We report a 2-years-old boy who had experienced repeated episodes of febrile and subfebrile refractory seizures and status epilepticus since 5 months of age, usually triggered by fever associated with respiratory infections. DS was diagnosed at the age of 18 months and after that, he change medication to valproic acid and topiramate and went on a respiratory rehabilitation program aimed to reduce respiratory events. In this case, seizures usually went along with respiratory infections, so that we thought that by preventing it and reducing its severity, we would reduce the frequency of seizures. A reduction in frequency of respiratory events and seizures was noticed.

Conclusions: DS illustrates a rare and severe form of infantile-onset epilepsy in which seizures are triggered by fever and respiratory infections. In our opinion, respiratory rehabilitation may have a role in such cases however, it is difficult to ascertain if it was the respiratory program or the drugs that resulted in seizure reduction. Besides that, another unanswered question is whether this attempt to reduce seizures will affect the epileptic encephalopathy and cognitive outcome. Further studies are needed.

Key words: Dravet Syndrome, epilepsy, respiratory rehabilitation

TYPE I LISSENCEPHALY – CASE REPORT AND LITERATURE REVIEW

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Introduction: Lissencephaly has long been recognized as a cause of intellectual disability. Traditionally, it has been separated into 2 categories: type I or classical type, and type II or cobblestone lissencephaly. It has an overall incidence of 1.2/100,000 births. Type I is a rare developmental disorder which results from a defect of neuronal migration, and can be associated with other brain and visceral anomalies. Although, most forms have a genetic origin, lissencephalic - like syndromes may result from several environmental insults or from maternal diseases.

The purpose of this case report is to describe the natural course of type I lissencephaly, options of rehabilitation care and clarify prognostic information available.

Material and methods: The authors report a clinical case of a 21-month-old boy with complex brain malformation and severe developmental delay. We describe the patient's clinical history and the main characteristics of lissencephaly syndrome.

Results/Discussion: The patient is a boy born at 36 weeks of gestation via uncomplicated spontaneous vaginal delivery to a 30-year-old primigravid mother. The mother, who was otherwise healthy, had an uneventful pregnancy. On delivery, the patient's first and fifth minute Apgar scores were 8 and 10, respectively. At his 4th month of age, he was admitted on Paediatric nursery by epileptic seizures. EEG recordings showed the presence of paroxysmal generalized activity. Brain MRI revealed signs of classical lissencephaly and dysgenesis of corpus callosum. He was evaluated for the first time, in our consultation on February 2012 with 5 months of age, and immediately started rehabilitation treatment.

Currently, the child is 21 months old, he shows: microcephaly; some signs of recognizing the parents and stimulus - related laughing, purposeful movements and sounds, ability to interact and establish eye contact; no grip skills; no head or trunk balance with decreased muscular tonus, and hypertonia of lower limb. We prescribed him a customized wheelchair, an AFO, reinforced rehabilitation treatment measures and recommendations for feeding and other daily cares. It is also crucial to maintain close surveillance of oropharyngeal incoordination.

Lissencephaly is a cerebral cortical malformation that should be considered in children with developmental delay and it should always be investigated in the etiology of early - onset epilepsy. MRI is considered the best neuroradiological study to identify this disorder. Somatosensory - evoked potential examination could be supplemental for predicting the neurologic prognosis.

The degree, distribution and detailed structure of lissencephaly vary widely and the clinical features are accordingly diverse. A precise analysis of each case is necessary to establish the prognosis and risk of recurrence.

Not much has been published on the follow-up of patients with lissencephaly or their life expectancy. The prognosis is considered to be extremely poor. Living patients may show profound mental retardation, spastic quadriplegia and epilepsy.

Conclusions: Life expectancy in Lissencephaly is limited, but with supportive care focused on the stimulation of neurodevelopment, prevention of infectious, swallowing and musculoskeletal complications, many of these children can reach adulthood. It is fundamental a pluridisciplinary team evaluation, prompt rehabilitation treatment planning and careful follow-up.

Keywords: Lissencephaly; developmental delay; epilepsy

NEUROLOGICAL IMPAREMENT AND TYPE OF AFFECTION OF THE PERIPHERAL NERVES IN CHILDREN WITH SPINA BIFIDA OCCULTA

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Introduction: Spina bifida is a congenital disorder that involves incomplete development of the spinal cord and its meninges. Spina bifida is developed at the end of the first month of pregnancy when the two sides of the embryonic spine fail to join, leaving empty space. It is known that 5-10% of the general population may have a less severe form of spina bifida, but in most cases the damage is limited to one or two spinal vertebrae. Occult spinal disorder in children can manifest varying degrees of neurological impairment in the lower limbs. Data from literature indicates frequent involvement of the peroneal nerve deficit in these patients.

The aim of this paper is to examine type and degree of neurological impairment, and type of affection of peripheral nerves of the lower limbs in children with occult spinal disorder.

Materials and methods: This is a retrospective study conducted on the group of 40 patients treated at the University Children's Hospital in Belgrade from 2001 to 2006. In this observational study we recorded pathological findings in functioning of peroneal and tibial nerve and also a degree of the impairment as: paralysis or paresis.

Results: In the observed group of children we found 30 children with paresis and 10 with paralysis as a form of neurological deficit. Nineteen children with paresis had affected the peroneal nerve and in 11 children with paresis had affected by tibial nerve. In the group of children with paralysis five children had pathological findings of the peroneal nerve while the three children had damaged tibial nerve. Two children had pathological findings of both observed nerves.

Conclusions: It can be concluded that paresis of lower limbs is significantly more frequent than paralysis in children with diagnosed occult spina bifida. Also we found out that these children more often have paresis as if paralysis of peroneal than the tibial nerve.

**THE IMPACT OF THE METABOLIC SYNDROME ON RESPIRATORY REHABILITATION
EFFECTS IN COPD PATIENTS**

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Introduction: The chronic obstructive pulmonary disease is a chronic inflammation of the airways and pulmonary parenchyma inducing a constriction of the airways which is partially irreversible despite the applied treatment. COPD is a systemic disease, affecting not only the lungs, but other organs and systems as well. The diagnosis and severity of COPD is often camouflaged by concomitant diseases. According to the latest definition of COPD and recommendations of the Global Initiative for Chronic Obstructive Lung Diseases (GOLD), besides the pulmonary symptoms, concomitant diseases and conditions should also be routinely investigated in each COPD patient, thus enabling a modern and comprehensive approach to chronic pulmonary patients, in terms of investigating the presence of metabolic disorders. The objective of this study was to establish the presence of the metabolic syndrome components (according to the National Education Program in the United States, NCEP-ATP III) in COPD patients, defining the impact of the metabolic syndrome on the respiratory rehabilitation effects, as compared to COPD patients with no components of the metabolic syndrome registered.

Materials and methods: Thirty-five patients with the diagnosis of COPD, treated in the Institute for Pulmonary Diseases of Vojvodina, Sremska Kamenica (Serbia), were evaluated for the presence of the metabolic syndrome components. The clinical definition of them metabolic syndrome (according to NCEP-ATPIII) is based on the presence of three of five criteria: abdominal obesity (the waist measure >102 cm for males, and >88 cm for females); elevated triglyceride levels on an empty stomach (>1.7 mmol/l), or a former history of this disorder treated; decreased HDL levels (<1.03 mmol/l for males and <1,29 mmol/l for females, or a former history of this disorder treated; an elevated systolic and/or diastolic pressure of > 135 mm Hg and > o 85 mmHg respectively; elevated blood glucose levels on an empty stomach (> 5.6 mmol/l), or already existing type 2 diabetes mellitus. Having measured the metabolic components, the patients were classified into two groups: Group I (8 patients) with registered metabolic syndrome components, and Group II (27 patients) with no metabolic syndrome components registered. Both groups were enrolled in the 10-day hospital rehabilitation program, which included breathing, strength and endurance exercises, performed for 30 minutes, twice a day. The following parameters were measured in both groups, before and after the rehabilitation: FEV1, ITGV, sat O2, 6 mwd test, BMI, Borg's Dyspnea Scale, MMRC Dyspnea Scale, BODE index.

Results: After the 10 - day respiratory rehabilitation, the following parameters were improved: 6 mwd test, Borg's Dyspnea Scale score, ITGV and MMRC Scale scores, consequently, the BODE index values significantly improved in Group II, as compared to Group I ($p<0,05$). Other parameters were not significantly altered.

Conclusions: The respiratory rehabilitation program obviously had weaker results in Group I, suggesting the presence of the metabolic syndrome may diminish the benefits of respiratory rehabilitation in COPD patients.

Key words: COPD, respiratory rehabilitation, metabolic syndrome

THE IMPACT OF A CARDIAC REHABILITATION PROGRAM ON MEN'S SEXUAL HEALTH

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Introduction: Erectile dysfunction (ED) shares pathophysiology and risk factors with cardiovascular disease (CVD). Cardiac Rehabilitation Programs (CRP) are intended to address and improve all aspects of the patients functioning and well-being: physical, psychological, and social, including sexual activities. Few studies have addressed the topic of sexual function in cardiac rehabilitation patients. The purposes of this study were to determine the effects of CRP on sexual function in male patients with CVD and the factors which influence sexual function after these programs.

Materials and methods: A prospective cohort study was performed, including male patients who completed an hospital based CRP (Phase II), between October 2012 and March 2013. Demographic and clinical information were collected. Functional capacity was estimated in METs (metabolic equivalents) achieved in treadmill exercise test at the beginning of CRP and three months later. Erectile dysfunction was assessed using the International Index of Erectile Function (IIEF) questionnaire and Quality of Life through the SF-36 Health Survey (SF-36 v2).

Results: The sample included 41 male patients, with the mean age of 58,44 ($\pm 10,31$) years. All patients were sexually active. 80,5% were admitted after an Acute Coronary Syndrome, 9,75% after an elective Percutaneous Coronary Intervention and 9,75% after Coronary Artery Bypass Graft. Regarding cardiovascular risk factors, 78% had dyslipidemia, 65,9% had hypertension, 48,8% currently smoked, 43,9% had BMI > 25 kg/m², 26,8% had Diabetes Mellitus type 2 and only 19,5% had family history of CVD. Most patients (85,4%) were taking beta blockers. In the beginning of the CRP 73,2% of the patients had ED while in the end of the program, this percentage decreased significantly to 63,4% ($p < 0,001$). However, there was no significant improvement in IIEF scores (16,54 vs 16,17; $p = 0,593$) at the end of CRP. Functional capacity improved significantly during CRP (9,19 vs 10,59 METs; $p < 0,001$) but it was not associated with an improvement in IIEF scores ($p = 0,174$). In a multivariate regression analysis, age ($p = 0,041$), diabetes mellitus ($p = 0,011$), hypertension ($p = 0,001$), dyslipidemia ($p = 0,034$) and a low score on the mental component of SF-36 v2 ($p = 0,02$) were identified as independent positive predictors of having ED at the end of CRP.

Conclusions: ED was present in over half of the patients undergoing CRP. Unlike the functional capacity, ED did not improve significantly during CRP. Determinants of ED after CRP are mostly related to age, diabetes mellitus, hypertension, dyslipidemia and a low mental component score in SF-36 v2. This study shows that cardiovascular risk factors modification and identification of patients with high levels of stress, are crucial in order to implement strategies to improve sexual health of patients who have suffered an acute cardiovascular event.

Key words: cardiac rehabilitation; cardiovascular disease; erectile dysfunction; sexual health

**REHABILITATION OF PATIENTS WITH PERIPHERAL OCCLUSIVE ARTERIAL DISEASE -
OUR EXPERIENCE**

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Introduction: Rehabilitation of patients with peripheral occlusive arterial disease (POAD) includes a functional assessment of peripheral arteries of the extremities and physical therapy. The goal of treatment is to reduce the subjective symptoms and improvement of objective function parameters (ankle-brachial index-ABI and distance of walk). Therapeutic exercises are obligatory part of treatment protocol, and vacuum-compressive therapy (VCT) has great significance as mechanical therapeutic agent in which the application of pressure and subpressure acting on the extremities. The aim of this paper is to present the effects of physical treatment in patients with POAD in stage II; Fontaine scale.

Materials and methods: Prospective study included 22 patients, average age of 68, among them there were 12 males and 10 women. All participants were in - patients in the Institute for the Physical Medicine and Rehabilitation „Dr Miroslav Zotovic“ in Banjaluka in 2012. The study followed the efficacy of the physical therapy (therapeutic exercises, VCT, current therapy) by measuring the distance of walk and ABI, prior and after the applied therapy. VCT was applied on lower limbs, with two types of parameters, depending on arterial pulsations – if palpable, the VCT parameters were (-35mmHg / 30sec, +30mmHg / 35sec) – if palpations weak or absent , the VCT parameters were (-50mmHg / 35sec, +25 /15sec). Duration of VCT session was 20 min. Student's t - test was used for data analysis.

Results: After 15 VCT treatments, which are used as part of the complex therapeutic protocol, during the period of one month, there was an increase in the initial and maximal distance of walk and there was a very statistically significant difference ($p=0.006$ and $p=0,007$ i.e. $p<0.01$) in values prior and after therapy. After 15 VCT treatments there was an increase in ABI value and there was a extremely statistically significant difference ($p<0.0001$) in values prior and after therapy.

Conclusions: The application of physical therapy may shorten hospitalisation, extend the life expectancy and working ability and lower the complication rate, but requires further research in this area.

Key words: Rehabilitation, POAD

IMPORTANCE OF PRIMARY PROPHYLAXIS OF VENOUS THROMBOEMBOLISM IN SURGERY OF HIP AND KNEE

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Introduction: Orthopedic surgeries such as hip and knee arthroplasty, treatment of fractures et al, lead to high risk (40% - 60%) of the occurrence of venous thromboembolism (VTE). Timely prophylaxis, however, reduces the risk for 10% up to 30%. Because of high incidence of VTE complications in orthopedic surgery, it is required to apply appropriate prophylaxis in order to reduce the risk to a minimum. This paper is aimed at showing the incidence of VTE in patients operated from the hip and knee as well at the importance of primary prophylaxis.

Materials and methods: The study of 100 patients, who were hospitalized at the Clinic for Orthopedic Surgery and Traumatology at the Clinical Centre in Belgrade, was carried out from 2009 to 2012. The subjects of the study had surgery of the hip and knee, 50 of them in the knee region, while 50 patients had surgery in the hip region. Postoperatively, the patients received *heparin*, low molecular weight, and some of them used an elastic bandage (elastic stockings). Out of the total of 100 operated patients, 74 were female and 26 male. Their average age was 68 years.

Results: Elastic stockings, as a form of mechanical prophylaxis, was used only by 6.7% of patients operated of the hip, and 14.5% of patients operated of the knee (Chi-square = 1.569, $p = 0.177$). Primary pharmacological prophylaxis was correctly dosed (per kg / BWT) in the 26.8% of patients operated of the hip, and in 39.0% of patients operated of the knee (Chi-square = 1.032, $p = 0.207$). Out of the 50 patients operated of the knee, 2 of them developed a deep vein thrombosis (DVT), while 48 were without DVT. Out of the 50 patients operated of the hip, 2 developed DVT, and 48 remained without this complication (chi-square = 0.021, $p = 0.884$). After knee surgery, 3 patients had pulmonary embolism (EP), while 47 were without this complication. After hip surgery, 2 patients had EP and 48 were without this complication (chi-square = 0.176, $p = 0.674$).

Conclusions: By applying recommendations for diagnosis and treatment of acute and chronic venous disease we can reduce high risk of VTE in patients operated of the hip and knee.

Key words: venous thromboembolism, orthopedic surgery, primary prophylaxis

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RIGHT FOOT BIG TOE AND LYMPHEDEMA

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Introduction: Researches of the connection between diseases of the right foot big toe and lymphedema are necessary in everyday practice for the orientation and possible prognosis and therapy.

Materials and methods: The pilot study was based on a sample of 30 teachers of our school who were submitted to the investigation of the right foot big toe and lymphedema according to the National Guide for vein diseases and lymphedema

Results: In all examined cases, both lymphedema and the changes on the right foot big toe were found. There is a statistically significant dependence between the patients with lymphedemas above the ankle and lymphedema consistence of $p = 0.96$ $p < 0.05$. The Student T test was applied in investigating the relation between the age and the change frequency.

Conclusion : lymphedema occurring once in a month or more frequently was found in significantly older population.

Key words: lymphedema, changes on the big toe of the right foot

**EFFECTIVENESS OF SUPERVISED - PHYSICAL ACTIVITY INTERVENTIONS ON
CANCER - RELATED FATIGUE IN CANCER SURVIVORS
A SYSTEMATIC REVIEW AND META - ANALYSIS**

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Introduction: Cancer-related fatigue (CRF) is a common problem reported by cancer patients with prevalence rates ranging from 80% to 100%; highlighting that numerous patients continue to experience fatigue symptoms for months or years after successful treatment. The etiology of CRF is multifactorial and presents an important variability among patients; however, it has been associated with emotional disturbances, some pharmacological treatments, nutritional imbalances, sleep disturbances and low levels of physical activity. Epidemiologic evidence suggests that the regular practice of physical activity can reduce the risk of developing cancer. The International agency for research on cancer (IARC) estimates that almost 25% of cancer diagnosis worldwide can be attributed to overweight, obesity and sedentary lifestyles. Additionally, physical activity has demonstrated significant improvements on the deleterious consequences of cancer, such as functioning impairment, fatigue, pain perception, and others. The more recent Cochrane systematic review, which searched clinical trials up to March 2011, reported that aerobic exercise can be considered as a beneficial intervention for individuals with cancer-related fatigue and encouraged further research in this field. The present systematic review aims to update research in this field by including studies published more recently in order to determine the effectiveness of supervised physical activity interventions on cancer-related fatigue in cancer survivors.

Materials and methods: This systematic review and meta-analysis was conducted according to PRISMA statement (<http://www.prisma-statement.org/>). The databases Pubmed/MEDLINE, CINAHL, EMBASE, Sports Discus, PsycINFO and the Cochrane Central Register of Controlled Trials (CENTRAL) were searched through March 1, 2013. The search strategy using boolean operators was as follow: *[(cancer OR cancer survivors) AND (physical activity OR exercise OR physical exercise) AND (cancer related fatigue OR fatigue OR fatigue symptoms)]*. Only clinical trials were accepted for inclusion. Physical activity interventions, such as aerobic exercise, flexibility and resistance training were admitted for inclusion regardless of training intensity. The primary outcome considered in this review was cancer-related fatigue symptoms measured through valid and reliable scales. The Physiotherapy Evidence Database (PEDro) scale was used for the assessment of risk of bias for the selected studies. For meta-analysis procedures, the I² statistic test was used for the assessment of heterogeneity considering the existence of heterogeneity for a value greater than 50%.

Results: After the application of eligibility criteria to the primary search strategy results, we identified 12 studies for inclusion [$k=12$ (100%)] with a sample size ($n=1689$ [100%]) and 55.0 ± 7.1 years old. The studies were published in a mean date of 2007.2 ± 3.3 and with a risk of bias score of 6.5 ± 1.0 . Breast cancer was the most common diagnosis [$k=6$ (50%)], followed by prostate cancer [$k=2$ (16.6%)]. Moderate intensity aerobic training was the most employed intervention (70%). The cumulative evidence showed that supervised physical activity intervention reduce Cancer-related fatigue (SMD= -0.33 (95%IC) [-0.54, -0.11]). A high heterogeneity was found ($I^2=71\%$; $P= 0.0003$).

Conclusions: The result of this meta-analysis indicated that supervised-physical activity

interventions can help to reduce cancer-related fatigue among cancer survivors. However,

current evidence is not enough to demonstrate what is the best physical activity training protocol

to reduce cancer-related fatigue. Further research is suggested.

Key words: Physical activity, cancer, fatigue

EXERCISE PRESCRIPTION IN DIFFERENT COMORBIDITIES

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Introduction: The evidence shows that regular physical activity provides substantial beneficial effects on health. Despite this evidence, the physical exercise program should be adapted to different comorbidities such as arthritis, diabetes, hypertension, obesity, osteoporosis, peripheral artery disease, pulmonary disease, among others.

Materials and methods: Research in PubMed database through the Mesh terms of scientific articles of the past 10 years.

Results: There is clinical evidence of an inverse relationship between physical activity and cardiovascular disease, osteoporosis, diabetes, obesity, cancer, anxiety, depression. Physical activity is recommended as first-line approach in the prevention of various diseases, as well as the first-line therapy of multiple comorbidities. A training program will be more successful if it is prescribed taking into account the person as a bio-psycho-social unique and adapted to comorbidities of the patient.

Conclusions: The prescription must obey the method PRO-FITT (Frequency, Intensity, Time, Type) in order to be a prescription methodical, measurable and specific to the patient and his comorbidities.

Key words: exercise, arthritis, diabetes, hypertension, pulmonary disease

LOW BACK PAIN IN SHWANNOMA – CASE REPORT

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Introduction: Lower back is very common and one of the most frequent reasons to refer patients to physiatrists. Although most cases are due to mechanical syndromes, it is common for oncologic patients to develop metastasis in the vertebral column. Primary tumors of the spinal cord on the other hand are relatively rare. Shwannomas are benign slow-growing tumors which derive from Schwann cells, the most important glia of the peripheral nervous system. These cells are normally found surrounding peripheral nerves in order to form myelin insulation sheaths.

Materials and methods: We report the case of a 61-year old female patient who presented two years of persistent lower back pain. The characteristics of the pain and previous imaging exams were compatible with a mechanical cause. After assessment a rehabilitation plan was implemented. The patient referred relief of lumbar pain in the follow-up consultation, however the physical exam detected hypoesthesia between D₇₋₈ and S₂, increased lower limb tendon reflexes, MRC grade 4 muscle strength and bradykinetic gait with slight claudication. An overactive bladder and constipation were also present, nonetheless, attributed to a rectocele. Emergency MRI-scan detected a paravertebral solid mass between D4 and D7 with infiltration into the vertebral canal through the intervertebral foramen and subsequent compression of the spinal medulla particularly between D5 and D6 as well as type II modic changes. Consequently the patient was admitted for surgery, the tumor was removed through a joint collaboration between both the Cardiothoracic and Neurosurgical teams and the surgical specimen was sent for histological analysis. Post-operative spinal MRI was done. A post-operative rehabilitation plan was put into action.

Results: Post-operative MRI-scan showed residual tumor on the right anterior lateral portion of the spinal medulla and significant muscle inflammation. Histological examination of the surgical specimen identified the tumor as a probable Schwannoma, not excluding nonetheless the possibility of being a hemangioblastoma. There was no evidence of malignancy. Treatments prior to the operation lead to some pain relief. Post-surgical rehabilitation has been positive with pain reduction, improved gait, increased muscle strength and regained ADL independence.

Conclusions: This is a case in which previous comorbidities masked the presence of a non-mechanical cause of the symptoms. This case demonstrates the importance of being aware of the differential diagnosis of lower back pain when presented with atypical clinical evolution during rehabilitation.

Key words: hemangioblastoma, schwannoma

**SPONTANEOUS SPINAL EPIDURAL HEMATOMA IN HEMODIALYSIS PATIENTS: THE RISK
BENEFIT OF ANTICOAGULATION**

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Introduction: Spontaneous spinal epidural hematoma (SSEH) is a rare neurosurgical emergency, where blood accumulates in the spinal epidural space spontaneously without obvious traumatic or iatrogenic cause. Although patients with SSEH may have spontaneous recovery, the typical outcomes include paraplegia, quadriplegia and even death. For most patients early diagnosis and decompression are recommended to prevent mortality and morbidity. Several factors have been associated with the outcomes, but controversy remains because of its rarity. Although the etiology of SSEH remains unclear, there have been reports of contributing factors including vascular malformation, reduced platelet count disorders, thrombolytic therapy, anticoagulation, leukemia, hemophilia, hypertension, pregnancy and minor trauma.

The use of anticoagulation in the treatment and prophylaxis of a variety of medical disorders has been long established but the known risk of bleeding while on treatment can't be ignored.

SSEH has been described in a variety of clinical scenarios, including chronic renal failure. Here, the risk benefit of anticoagulation must be weighed, particularly in severe renal impairment. End stage renal disease patients have a high risk for the development of hemorrhage because of anticoagulants administration during dialysis, hypertension, uremic bleeding disorder and intracranial pressure fluctuations during hemodialysis.

Materials and methods: The authors conducted a literature review in the context of a clinical case. They searched on PUBMED and COCHRANE databases using the keywords "chronic renal failure", "low molecular weight heparin" and "spontaneous spinal hematoma" to identify studies that focused on SSEH in patients with chronic renal failure in hemodialysis and try to understand the underlying mechanism.

Results: There are few reports of spontaneous spinal epidural hematoma in hemodialysis patients and the etiology is still unclear. Nevertheless we know that enoxaparin is renally eliminated so there are recommendations for dose adjustment in patients with severe renal impairment (creatinine clearance <30 mL/minute), which must imperatively be applied so as to minimize their potential risks. Observations from clinical trials that utilized standard enoxaparin dosing and included patients with severe renal impairment noted an increased incidence of major bleeding.

Conclusions: Spontaneous spinal epidural hematoma, although rare, alerts us to the possibility of complications related to anticoagulation, and even when controlled, is not without risk with potentially catastrophic consequences. Patients with severe renal impairment are a challenge and given the problems in predicting or monitoring the effects of enoxaparin in these patients, we wonder if it can be used for prophylactic or systemic anti-coagulation in this population of patients with reasonable safety.

Key words: chronic renal failure, spontaneous spinal epidural hematoma, low molecular weight heparin

OSTEOGENESIS IMPERFECTA: CASE REPORT

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Introduction: Osteogenesis imperfecta (OI) includes a heterogeneous group of genetic disorders characterized by an increase in skeletal fragility, a decrease in bone mass and a susceptibility to bone fractures of different entity. The prevalence is 1/10.000 - 1/20.000, earlier is the onset severer is the disease. People with severe forms may undergo hundred of fractures throughout their life and numerous other complications. In 95% of cases, OI is due to mutations of the genes COL1A1 and COL1A2 (COL1A1 is located on chromosome 17 and COL1A2 on chromosome 7, at position 17q21.33 and 7q21.3). COL1A1 and COL1A2 encode for Alpha1 and Alpha2 chain of type I collagen respectively. Mutations in those genes are responsible for all five type of OI. It is usually an autosomal dominant disease, nevertheless autosomal recessive forms of OI have also been described, which are linked to mutations in LEPRE1, CRTAP and PPIB genes (1p34.1, 3p22 and 15q21-q22). Autosomal recessive forms are more severe when they are associated with severe hypotonia.

Case report: Three siblings with family history of multiple fragility fractures have been followed in our Physical Medicine and Rehabilitation Department for the past six months.

The older sister of 25 y.o. has been experiencing fragility fractures since she was nine months, at that time she fractured a finger of her right hand. Successively she underwent fractures at the right clavicle (4 years), right radius (three months after), wrist and left radius (10 years). At the age of 16 she underwent surgery for correction of the left flat foot. DEXA examination showed no spinal deformities, the X-Ray of dorsal and lumbosacral spine showed no vertebral fractures. The brother of 14 has reported the fracture of D9 at 6 years old, accidentally caused by a fall off a chair; when he was 7 he fractured L2; at 9 years of age he fractured the right wrist; when he was 11 he fractured his left wrist and the 1st phalanx of the right toe. Morphometric examination by DEXA highlighted multiple vertebral deformities (T4, T5, T6, T7, T8, T9 and L1). The X-Ray of spine + pelvis under load showed modest dorsal left-convex scoliosis together with structural alterations of dorsal vertebral bodies with reduced thickness. Basin is in axis. Dorsal kyphosis and lumbar lordosis are accentuated.

The younger sister was 11. She presented several fractures since her childhood as well. The first trauma was at left proximal radius at 5 years old. Subsequently she reported the fracture of the left wrist (5 and 9 years) and of the left olecranon (10 years). The X-Ray of spine + pelvis under load showed modest right-convex lumbar scoliosis together with morphological alterations of the wedge-shaped body of L2. Basin in axis. Adjusting amplitude of the physiological curves of the spine. The X-Ray lumbosacral spine: modest right-convex lumbar scoliosis. Basin in axis. Adjusting amplitude of the physiological curves of the spine.

According to clinical, laboratory and instrumental profiles, we believe is necessary to further investigate the genetic profile of all three siblings. We aim to identify possible mutations of genes linked to OI. Molecular analysis are still in progress. Preliminary results for gene sequencing were negative for the gene COL1A in all three siblings.

Key words: Osteogenesis imperfecta, fractures fragility, genetic mutations

IS A DISTRIBUTION OF EARLY REHABILITATION MODALITIES IN PATIENTS AFTER ACUTE ABDOMINAL OPERATIONS IN CORREALTION WITH SURGICAL INTERVENTION SEVERITY?

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Introduction: Early rehabilitation is carried out in the early period after injury, illness or immediately after surgery and when the patients general condition allows it.

The aim of our study was to evaluate the presence of early rehabilitation procedures and the length of their duration in patients after abdominal surgery for better planning of resources in relation to the individual patients needs for rehabilitation.

Material and Methods: We analyzed the presence of performed physical therapy procedures in patients operated from acute surgical diseases and conditions: the gall bladder (30 patients), appendicitis (40 patients) and patients who undergone resection of the stomach (30 patients). Testing was conducted on a surgical ward of Emergency Center at Clinical Center of Serbia, during last 6 months of 2012 year. The physical therapy modalities were divided into three groups: Group1-respiratory rehabilitation (inhalation, forced expiratory flow exercise, drainage percussion), Group 2-verticalization (sitting, standing, walking), Group 3-kinesiotherapy (passive, active-assisted and active exercises, exercises for peripheral circulation, static exercises for quadriceps and gluteal muscles). Distribution in relation to the length of hospitalization (days) and the type of surgery was followed.

Results: In almost every third patient (36.7%) with cholecystectomy, every fifth (17.5%) with an appendectomy, and in more than two-thirds of patients (70%) with gastrectomy respiratory rehabilitation was performed. All patients were included in verticalization program. It is shown that verticalization was significantly more frequently applied versus respiratory rehabilitation ($p < 0.05$). For all investigated pathological conditions it has been shown that active exercises were significantly more frequently applied, followed by active-assisted exercises, while passive exercises were conducted the least frequently ($p < 0.05$). Physical therapy was performed significantly longer in patients with gastrectomy (6.14 ± 1.29), followed by those who underwent cholecystectomy (3.27 ± 1.14). The shortest duration of physical therapy was for patients who underwent appendectomy (2.31 ± 0.97). It is shown that there is statistically significant difference in duration of the rehabilitation program in relation to the type of disease or conditions ($p < 0.05$).

Conclusion: Individual approach to every patient concerning planning and implementation of early rehabilitation program, as well as teamwork which is composed of different specialties physicians, therapists, nurses, is necessary condition for the successful recovery of the patient. Our results showed that the severity of surgery requires complex physical therapy for the recovery of patients and longer duration of rehabilitation. These results stress out better planning and allocation of human resources in relation to the type of surgical procedure.

Key words: Early rehabilitation, cholecystectomy, appendectomy, gastrectomy

**FEEDING INDEPENDENCE AND SPEECH AND LANGUAGE DISORDERS IN
NEUROLOGICAL HIGH-RISK CHILDREN**

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Introduction: Children who are in the antenatal, perinatal, or postnatal period exposed to the effects of risk factors are classified as neurological high-risk children. These children often have psychomotor development disorders. Among other problems, they may have feeding difficulties and delays in speech and language development. These two functions are interconnected through oral motor skills that are essential for eating processes as well as for speaking skills and the ability of expression.

Materials and methods: The paper analyzes ways of feeding and speech and language status with chronological age of the neurological high-risk children involved in the habilitation treatment. The sample consisted of 107 children involved in the habilitation treatment at Institute for the Physical Medicine and Rehabilitation "Dr Miroslav Zotović" Banja Luka.

Results: Average age for this sample was 3,21 years, with a range from 2 to 5.5 years. The sex ratio was 59.8: 40.2 in favor of males. At the liquid diet was 9.3%, mashed 50.5% and normal 40.2% of the sample. Via nasogastric tube fed 2.8%, through bottle 12.1%, and with a spoon over 85% of the sample. Regarding feeding independence, 22.4% children from this sample were independent in feeding, 45.8% were partly independent and 31.8% were dependent on others. Average age of the children that were at the liquid diet was 3.13, mashed 3.08 and normal 3.40 years. The sample consisted of 35.5% immobile children, 20.6% children that needed the help of another person or aids and 43.9% independently mobile children. 75.7% of the sample had some kind of speech and language impairment, 18.7% of the sample had no speech and language difficulties. For six children, speech and language status was unknown. Of 81 children who had speech and language difficulties, 49 was at liquid and mashed diet which shows a deficit of oral praxis in this group of children. There is a correlation of medium level between feeding types and speech and language status in neurological high-risk children ($r=0,533$). In the group of children that had speech and language impairment, 10 were fed through bottle, 68 with spoon and 3 via nasogastric tube. There is a high correlation between feeding ways and speech and language status in neurological high-risk children ($r=0,736$).

Conclusions: The largest number of neurological high-risk children are at liquid and mashed diet, although the average age of the sample is 3.21 years, which shows the problems of delay in the development of oral motor skills. Most of the sample has speech and language disorders. There is a correlation between types and ways of feeding and speech and language status.

Key words: oral motor skills, feeding difficulties, speech and language disorders

ASSESMET OF THE VALIDITY OF THE JUVENILE ARTHRITIS FUNCTIONALITY SCALE ON CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS IN SERBIA

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Introduction: The physical function is very important component in clinical evaluation of the activity of juvenile idiopathic arthritis (JIA). The most widely used questionnaire for functional assessment is the Childhood Health Assessment Questionnaire (CHAQ), which main disadvantage is its length (69 questions) and its lesser applicability for the children of younger age due to its complexity. The aim of the study was to assess validity of the new, short and simple questionnaire -The Juvenile Arthritis Functionality Scale (JAFS) on the children with JIA.

Materials and methods: The study included 80 consecutive children treated in the Institute of Rheumatology from January 2010 till April 2011, all diagnosed JIA, 56 (70%) girls and 24 (30%) boys, mean age 10.17 ± 4.91 years, disease duration 3.68 ± 3.19 years. Construct validity of JAFS questionnaire was tested by comparison with CHAQ, and core set variables of disease activity (laboratory indices, articular indices, parent's and children's assessments of overall wellbeing and pain, and the physician assessment of disease activity). It was predicted that correlation of the two functional status measures will be strong, and the correlation with other JIA activity measures will be moderate to weak. Also, the ability of the JAFS questionnaire to recognize different degrees of disability among patients based on Steinbrocker's functional class criteria was tested. Spearman correlation coefficient (r), Interclass correlation coefficient (ICC), Kruskal-Wallis test and χ^2 test were used for statistical analysis.

Results: Correlation of both JAFS I CHAQ questionnaires with other JIA activity measures is statistically highly significant ($p < 0,01$), and for all variables it is higher for JAFS than for CHAQ. Correlation of two questionnaires is high ($r = 0,846$ for parents; $r = 0,898$ for children), while the correlation of questionnaires with other JIA activity measures is moderate to low ($r < 0,7$), and corresponds to predicted correlation. The level of concordance between parents and children are high for both questionnaires (ICC 0,81 for JAFS; ICC 0,87 for CHAQ). There is statistically significant difference of total JAFS score and JAFS subscale scores for lower limbs and hand/wrist, among patients belonging to different functional classes according to Steinbrocker's functional class ($\chi^2 8,427$; $\chi^2 8,774$; $\chi^2 10,787$ $p < 0,05$).

Conclusions: JAFS questionnaire shows equally good, even better, construct validity compared to CHAQ on the patients with JIA, it has good discriminative ability, so it can be considered as adequate tool for assessment of functional status of children with JIA.

Key words: juvenile idiopathic arthritis, functional assessment

IMPORTANCE OF THE POSTURE IN CHILDREN WITH NEUROLOGICAL DYSPHAGIA

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Introduction: Children with neurological disabilities may have an increased risk of swallowing disorders – (dysphagia: *JC Arvidson, 2008*). A particular attention must be given to postural seating systems for inadequate devices for postural control can aggravate dysphagia and also the typical co morbidities frequently occurring in these patients (GERD, reduced thoracic excursion, secondary skeletal deformities). Therefore improving oral motor skills and jaw and head control in these children is essential and it requires a specific training along with a proper postural alignment. The aim of this study is to evaluate the rehabilitative training effectiveness for oral motor abilities when using *ad hoc* seating posture systems in children already undergoing rehabilitation treatment in unfavourable postural conditions. Furthermore to verify how improving posture alignment may reduce care burden-duration of meal time for the caregiver in the home setting.

Materials and methods: 20 patients (average age 6.5 years, range 4-10 years) with neuromotor disorders (GMFCS IV-V) suffering from neurological dysphagia, were assessed by the physiatrist and the speech pathologist, who programmed the rehabilitation assessment that could include the following clinical and instrumental evaluations: digestive surgeon, otolaryngologist, dentist, and orthopaedic technician, videofluoroscopic swallow study (VFSS). If necessary, both seating postural systems and oral motor therapies (20 sessions) were reviewed. At the beginning and at the end of the training, standardized scales have been administered for posture (SPCM, LSS) and for neurological dysphagia (SOMA, NOMS).

Results: The main problems we observed in these children are the inadequate head support, the limited containment and alignment of the trunk and the pelvis, the hip angle flex/ext < 90°, the incorrect positioning of the hip belt, which could affect breathing and increase intra-abdominal pressure. A direct correlation emerged between postural misalignment and dysphagia severity. A correct posture and oral motor therapies have determined an improvement of oral motor skills (as confirmed by the scales SOMA and NOMS). Moreover a reduction of time was observed in the administration of meals - care burden.

Conclusions: A multidisciplinary team approach in children with neurological dysphagia allows to coordinate a global assessment and to take decisions in order to assure an optimal rehabilitative outcome.

Key words: Child, neurological dysphagia, neuromotor disorders, postural alignment

ENTRAPMENT NEUROPATHIES OF THE UPPER AND LOWER EXTREMITIES

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Objective: 1) To describe the common entrapment neuropathies of the upper and lower extremities; and 2) To discuss the role of electrodiagnosis in entrapment neuropathies.

Definition: Entrapment neuropathy is injury of the peripheral nerve by compression along its course by body structures. It usually occurs through a fibrous or osseofibrous tunnel or at a point where the nerve abruptly changes its course through deep fascia over a fibrous or muscular band. Common examples at the upper limbs: Carpal tunnel syndrome (CTS), ulnar entrapment (at the wrist or elbow), proximal median neuropathy, thoracic outlet syndrome (TOS), suprascapular nerve entrapment, radial nerve entrapment, posterior interosseous nerve entrapment and musculocutaneous nerve entrapment.

Common examples at the lower limbs: Common peroneal nerve entrapment (at neck fibula), tarsal tunnel syndrome (TTS), anterior TTS, neuralgia paresthetica, femoral nerve entrapment, saphenous nerve syndrome and sciatic neuropathy.

Diagnosis: It is usually made by the clinical manifestations and confirmed by electrodiagnosis (and sometimes by imaging). Clinical findings include pain and paresthesia at area supplied by the involved nerve, weakness of muscles supplied by the affected nerve distal to the site of entrapment and positive confirmatory tests (tinel's sign or Phalen test).

Role of electrodiagnosis: Electrodiagnosis can localize the site of entrapment, reveal the type of nerve pathology (neurapraxia or axonotemesis) and assess the extent of the lesion (partial or complete).

The commonly used electrodiagnostic procedures: Nerve conduction studies (motor and/or sensory), sensory comparative studies (for very mild CTS), F wave and H reflex (for TOS and sciatic neuropathy) and electromyography (to detect signs of denervation at muscles supplied by the affected nerve distal to the site of entrapment) are usually used. Somatosensory evoked potential may be needed to differentiate entrapment neuropathy from nerve root lesion. The appropriate electrodiagnostic procedure is chosen according to the nerve to be examined and the expected site for entrapment.

The expected electrodiagnostic findings: Slow nerve conduction across (or distal to) site of entrapment (including prolonged distal latencies in entrapment of the distal part of the nerve), decreased CMAP amplitude, decreased SNAP amplitude, unobtainable nerve conduction (in severe entrapment) and electromyographic signs of denervation at muscle supplied by the affected nerve.

W – 05 / W – 10

ONE DAY MUSCULOSKELETAL SONOGRAPHY COURSE

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Objectives:

- Learning the technical characteristics and setting of ultrasound equipments for MSK examinations.
- Learning the systematic standardized sonographic scanning method of each anatomical region of the knee and hip, according to the EULAR guidelines.
- Stressing on the importance of sonography for the early diagnostics of knee and hip pathology.
- Learning the technique of intraarticular injections under the control of ultrasound.

Methods:

Course will be a combination of lectures and practical sessions, consisting of theoretical talks and supervised hands-on scanning of healthy persons and/or patients with musculoskeletal disorders.

PROGRAM:

Lecture: Approach to the patient and the machine - Practical handling of the ultrasound machine settings

Lecture: Normal sonographic findings – knee

Lecture: Basic pathological sonographic findings – knee

Lecture: Normal sonographic findings – hip

Lecture: Basic pathological sonographic findings – hip

Lecture: Injections under the sonographic quidenance

INTRATHECAL BACLOFEN THERAPY FOR TREATMENT OF CNS SPASTICITY

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Introduction: In some patients severe spasticity of cerebral or spinal origin can not be treated successfully with conventional oral medication or physical modalities. Intrathecal baclofen therapy with implanted pump represents effective treatment from mid-80's. Baclofen (Lioresal) is a muscle relaxant and potent GABA agonist that acts via GABAB receptors at the posterior columns of spinal cord level, to inhibit the release of excitatory neurotransmitters by inhibiting calcium ions influx into presynaptic terminals. This direct binding on spinal cord receptors leads to higher efficiency compared to peroral therapy in which baclofen does not pass the brain-blood barrier. Intrathecal Baclofen Therapy (ITB) involves the long term delivery of Baclofen to the intrathecal space surrounding the spinal cord for the purposes of relieving severe spasticity. This delivery method of Baclofen is used when oral medication or conventional physical therapy no longer manages the spasticity sufficiently, and the spasticity has an impact on the quality of life of the patient.

The benefits of ITB to the patient are well documented, and typically reduce muscle spasms, tone and pain. This in turn increases mobility, independence, stamina, sleep and an overall increased quality of life. In addition to the patient benefits, there is also a reduced workload for care by patient caregivers and family members.

Since ITB therapy, as a part of broader neuromodulation therapy, is regarded as functional treatment, interdisciplinary approach is necessary for building a successful center and achieving a long term therapeutic goals. As rehabilitation medicine specialist is only holistic oriented specialist, with knowledge of functional assessment, it is recommended that therapeutic process is coordinated by the PRM specialist.

Key words: Intrathecal baclofen pump, spasticity, central nervous system lesion, rehabilitation

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Dear friends and colleagues,



It's a pleasure to welcome you to 10th Mediterranean Congress of Physical and Rehabilitation Medicine and 13th National Congress of the Serbian Association of Physical Medicine & Rehabilitation (SAPMR), as well. It will take place in Budva, Becici (at the "Splendid – Conference & SPA Resort Hotel"), from 29th September to 2nd October 2013.

The motto of this year congress is ***"The Rehabilitation Medicine in the Mediterranean Area: Interaction for Rehabilitation"***, meaning the necessity to intensify collaboration of regional PRM societies in education, treatment protocols, research and legislation and thus give a new rise of quality of our national rehabilitation services.

Physical medicine and rehabilitation is now one of the most positive and most dynamic areas of medicine, which led to the development of new rehabilitation methods, promotion of research and introduction of innovative programs in rehabilitation. PMR has led to the development of assistive technology that is moving out of the ordinary aids to robotics and sophisticated electronic systems for stimulation, communication, education, environmental control and increased mobility. New technologies have led to a decreased disability, increased independence, better participation and quality of life of chronic patients.

Within dynamic medical and scientific industry, such as physical medicine and rehabilitation, it is very important that continuity of knowledge and exchange of opinions is ensured. It is therefore essential for a modern Physiatrist – practitioner to monitor carefully and continuously what is happening in the world of science and medical practice. I am confident that this Congress and the book which accompanies it, will be of a significant help. Certainly, the greatest credit goes to the authors of invited lectures and oral presentations who have invested all their knowledge and experience, consulting the latest world literature, in order to achieve that goal.

This year meeting is organized under the auspices of Serbian Ministry of Health, Serbian Ministry of Education, Science and Technology, and Serbian Association of Physical Medicine & Rehabilitation. The meeting is endorsed and under the auspices of UEMS, Board of Physical & Rehabilitation Medicine and European Society of Physical & Rehabilitation Medicine. We are convinced that the congress venue is an added value since Budva & Becici coast offers wonderful sceneries in September and October.

We are grateful to all who contributed that this book, in its present form, has seen the light of day, as well as to all those who will, through their presence at the Congress and the use of this text, contribute that these events justify their existence and continue to live.

Lazovic Milica

Prof. Milica Lazovic, MD, PhD

President of 10th Mediterranean Congress of PRM
President of Serbian Association of Physical Medicine & Rehabilitation

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PRM: SCIENTIFIC AND MANAGEMENT KNOWLEDGES TO GUARANTEE HOLISTIC AND EFFECTIVE CARES FOR DISABLED PEOPLE

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Many international documents in recent years, mainly from UN and WHO, for example World Convention, ICF and recently WRD, have described how Rehabilitation and its scientific developments are focuses on Disabled People Rights to help any country to create an “inclusive” community.

Rehabilitation really involves the use of all means aimed at reducing the impact of disabling pathologies and health conditions in a global approach to solve the person’s problems in order to achieve optimal social integration. Within any health context, rehabilitation specifically is defined as “a process of active change by which a person who has become disabled acquires the knowledge and skills needed for optimal physical, psychological and social function”.

Rehabilitation include integrated social and sanitary interventions (evaluations of issues, possibilities and perspectives for person and context, in a Team form to maintain continuity, integration and synergy, following the Individual Rehabilitation Plan up to the better outcomes), many different structures, agencies and settings: so it is necessary to have a real Network.

This awareness is really important in this period, mainly in Europe, when Health Services are changing for many reasons (scientific, social and financial too).

PRM role and responsibility are to show how can be realized a wide and global rehabilitation system to defend and gain Health for all; involving and renovating many aspects of health and social services in a synergistic way to reach the best outcomes for people, in the suitablest way, reducing expenses and wastes.

Offering different cares timely, in a real continuity and coherence, involving and guiding many different professionals, maintaining the centre on the Person (possibilities, prognosis, free wishes, family and context), evaluating evidences and results on the functional outcomes.

In this general strategy the Italian National Plan for Rehabilitation is an attempt to connect different responsibilities, facilities, interventions for PRM doctors, in different times and places, modifying deeply the “traditional” relationship between Health Services and Rehabilitation.

PRM is an independent medical specialty concerned with the promotion of physical and cognitive functioning, activities (including behaviour), participation and modifying personal and environmental factors. So it is responsible of the prevention, diagnosis, treatment and rehabilitation management of people with disabling medical conditions and co-morbidity across all ages.

PRM Doctor have (as unique among Medical Specialists) the holistic approach to people (disabled or at risk being in disabling conditions) really necessary to this Network-management. They also work within the concept that the access to the full range of rehabilitation services is a fundamental human right and that the patients within PRM services have complete autonomy in directing the aims of their rehabilitation programme through informed consent and choice.

The fundamental outcomes of rehabilitation are the person’s well-being and also their social and vocational participation. The PRM specialists have a crucial responsibility to the active engagement and the learning process that the patient must go through: the principles of adaptation and plasticity are necessary as (and together) the clinical (surgical, pharmacological, technological, physical, psychotherapy) interventions.

PRM specialists are able to use these principles, which help to design strategies to enhance outcomes and avoid mal-adaptation. (motor learning and recovery, inducing skill - acquisition relevant to the patient daily’s life, preventing a learned non - use phenomenon to restore function: improving activity and enabling participation).

Rehabilitation is a continuous and coordinated process, which starts with a change of one's conditions of Functioning, Health and Participation (the onset of an illness or injury or their consequences), proceeds by a Teams Networking of many professionals and settings, closely together organised goal-oriented, patient centred manner and goes through to the individual empowerment.

PRM specialists use specific diagnostic assessment tools, taking into account the individual's personal, cultural, vocational and environmental context.

PRM specialists are the leaders of the teams involving any needed professional and are responsible for their patients' care in specialised PRM facilities. He is responsible for developing an individualised rehabilitation plan for each patient through a specific assessment and through the assessments of parents and care-givers.

Only in this way, rehabilitation is able to enhance patient functioning and participation by providing a coordinated source of information, advice and treatment for the person with disabilities and the family, with the team acting as provider and catalyst.

The most important part of the work must be a thorough understanding of the natural history of acute and chronic disabling disease, of the consequences of impairments and their impact on functioning (activity and participation), in close relation to the natural history of life, wishes and actual possibilities of the person and of the context. The Rehabilitation Prognosis needs to have a clear view on issues of personal activities of daily living, care, return to work, studying, feelings, driving, etc.

PRM specialists work in various facilities from acute care units to community settings. Unitary is the methodology (to guarantee the flow of information, patients and the audits also on scientific aims towards Evidence) and is based on the use of specific diagnostic assessment tools and the homogeneous carry out treatments including pharmacological, physical, technical, educational and vocational interventions.

In a traditional medical intervention the evaluations and prognosis are based on an analytic separation of the single bio-pathological factors followed by their rational integration into an overall sum; in contrast, a primarily PMR approach leads to considering the whole (functional, emotional, motivational and behavioural) as the primum movens focusing the parameters for determining the modality, limits and aims of the care only on this. Since health status is the result of a complex and large number of different factors, the therapeutic pathway to reach the maximum possible levels of recovery and maintenance must be equally complex, synergic and multifactorial, despite the fact that sometimes the single pathological conditions have a serious and chronically progressive course, or even a dismal prognosis.

Physiatrist's competence (and in the same time the activities and responsibilities) are:

- medical assessment in determining the underlying diagnosis (often many)
- medical treatment
- assessment of functional capacity
- assessment of activity and participation as well as contextual factors
- devising a rehabilitation plan
- knowledge, experience and application of medical, physical and technical interventions
- evaluation and measurement of outcome
- prevention and management of complications
- prognostication of disease/condition and rehabilitation outcomes
- knowledge and experience of using of rehabilitation technologies to assist at impairment, activity and participation levels
- team dynamics and leadership skills
- teaching skills
- knowledge of the social system and other related community agencies
- knowledge of legislation on disablement and of human rights of people with disabilities
- knowledge of how to get help for people with acquired and congenital disabilities due to illness or trauma

In all these aspects the cognitive, psycho-relational, learning, motor, attention, awareness patients matters are fundamental, even if the illness is not directly connected with the nervous system. And on other hand, the involvement of activities and functioning based on nervous system (the “structure” as ICF says) is necessary to evaluate the conditions and the prognosis of the person, to carry out the interventions, to support the active engagement and the adaptation of the person and of the context.

As the person is an individual, equally must be Individual the Rehabilitation Plan, equally too must be unitary the Rehabilitation Network to offer adequate and coherent services: different settings from acute to community, different services and agencies from health to social, cultural and financial, many professionals and different competencies, different times in the natural history of illness, various and integrate support for functioning and participation.

We all realise the great changes that have taken place in our perception of health, the conditions necessary for subjective wellbeing and for what we define as “quality of life”. Disorders, symptoms and phenomena that perhaps in the past were supported and considered inevitable are now no longer accepted and demands are rightly made for all treatments that can eliminate or alleviate such problems. This is causing an ever more rapid expansion in the duties and aims of Medicine, as the frontiers of the needs and requests of citizens enlarge. There is a parallel expansion in overall requests for services and performances, which are not limited only to the field of health care, but extend more generally to social policies. Of course, all this must be proportional to the real existence and potential of treatments, based on scientific evidence and not only on hopes and illusions.

The starting point of all rehabilitation activities and associated professional and organizational responsibilities is the right of the individual, in the face of whatever Participation limitation and/or Disability that alters even only transiently his autonomy, self-sufficiency and self-determination to receive a diagnostic evaluation, a prognosis and, if possible, a treatment suitable for the problem related to his overall bio-psycho-social situation; these must be understandable and controllable by everyone. Social Participation is a term that very well represents the Person’s fulfilment of this set of activities and rights.

The individual’s right is inextricably bound to the duty of society to guarantee every person all the instruments suitable for maintaining, for as long as possible and at as high a level as possible, personal autonomy in participation in social tasks. It is also society’s duty to optimise and at the same time verify the appropriate use of the many available rehabilitative instruments with respect to parameters of efficacy, efficiency and sustainability. It is equally obvious and important that all the problems of the economic sustainability of services, in proportion to the evidence of their efficacy and suitability, must be approached with complete clarity of information. Such information, first of all for the choices in the general context of the population and in parallel for individual cases, is an essential element for building active and conscious involvement in the process of rehabilitation of the Person, and of the community as far as is necessary.

PRM has the main role, and the main responsibility to create a common framework to face every these problems by adequate Rehabilitation evaluations, treatments, programmes and home/workplace modifications; involving, in different times, various institutions, places and professionals too in a real Network offering and guiding an effective global solution for the needs of the Person and of the Community.

Only the scientific and professional knowledge of a holistic approach like PRM can offer is adequate now and for the future in the interests of disabled people.

Regarding the common development of pathological and demographical aspects, mainly in Europe but in all other regions, probably only this model can be effective and sustainable in the financial field too.

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QUALITY OF CARE IN REHABILITATION SERVICES

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Quality of health care remains an area for improvement, despite the increased attention it has received in recent years. Patient dignity is a central, sometimes overlooked, facet of health care quality in hospitals and rehabilitation services.

Quality Management (QM) in rehabilitation facilities is characterized by continuous efforts to further include and realize the requirements and demands of patients, relatives, employees, payers but also referring doctors and hospitals. It is a systematic and continuous process focusing on identification, analysis and improvement of quality of structures, processes and results.

Among the main requirements for the QM are:

- Evidenced based and international state-of-the-art guidelines and rehab protocols
- Monitoring, evaluation and assessment of measures on all levels (technical services, administration, nursing, rehab medicine and therapy, etc.)

The final goal should be a continuous work on and the increase of patient and staff safety, patient satisfaction, medical outcome and effectiveness.

Using a systematic approach to PRM service delivery, one may see the relationship between disease (through ICD), function (through ICF), and interventions (through services and health interventions). The instruments of Quality Assurance (QA) should include the International Classification of Functioning, Disability and Health (ICF) of WHO.

As a specialty, PRM supports the use of quality measures, however, unlike many other physicians who are held to diagnostic-specific quality measures, physiatrists concentrate on functional outcomes with a wide degree of inter-patient variability which poses unique challenges to creating meaningful and specific quality measures and to developing performance measures. While there are a number of measurement sets applicable to various settings of rehabilitative care, there is no generally accepted or universally applicable outcome measures for disability or functional status that have been nationally endorsed for quality incentive reimbursement.

Specialists in Physical and Rehabilitation Medicine play a complex and strategic role in the QA, which starts with a clear medical diagnosis, a functional and social assessment and continues with the definition of the different goals to achieve, according to the patient needs, the set up of a comprehensive strategy, the achievement of personal intervention and the supervision of team or network cooperation. It ends after a final assessment of the overall process.

**WORLD REPORT ON DISABILITY FROM WHO: A GUIDE TO DEVELOP REHABILITATION
AND DISABLED PEOPLE'S RIGHT IN MEDITERRANEAN REGION**

Alessandro Giustini (Italy)

More than a billion people experience disability, and global trends such as the ageing population and the global increase in chronic health conditions mean that the prevalence of disability is rising. After United Nations Convention on the Rights of Persons with Disabilities (CRPD), attention has focused on ways to combat discrimination, promote accessibility and inclusion, and promote respect for people with disabilities.

We all realise the great changes that have taken place in our perception of Health, of subjective wellbeing and about what we define as "quality of life". Disorders, symptoms and phenomena that perhaps in the past were tolerated and considered inevitable, now are no longer accepted: many demands are rightly made for treatments that can eliminate or alleviate such problems.

It is changing the GOAL ! And Rehabilitation is the centre of this transformation: demand is growing and there is a parallel growth in the scientific potential to modify disabilities that previously could not be treated with success.

In any part of the World tree forces mainly support Rehabilitation development:

Disability and participation restrictions are visible and concrete demands for us and for the Community. Science (research, evidence, efficacy, education...) is absolutely necessary but not sufficient to promote interventions.

Rights on the contrary are the indispensable motive power and the justifications for increasing investments.

CRPD shows that disability and rights are intimately interlaced: Disability is a condition of life that is either permanent or temporary for millions of people and on the other hand people with disabilities must be empowered and granted access to essential resources to be able to lead optimal lives. This moral and in the case of signatory countries to the Convention legal concreteness of this groundbreaking document is now becoming ever more visible in both high resourced countries where the demand of rehabilitation, technologies, and advanced and innovative care has to adhere to criteria of scientific evidence base, sustainability and efficacy as well as in low and medium resourced countries where deep rooted and systemic interventions to construct simple services for health, prevention and rehabilitation are urgently needed.

The 2011 World Report on Disability sintesizes contents and concrete possibilities creating a sort of AGENDA for any Country to encrease step by step the Rehabilitation to defend rights and quality of life for disabled peoples.

This pioneering Report provides evidence to support policies and programmes that can improve the lives of people with disabilities. Drawing on the best available scientific evidence, this report is a valuable resource for policy-makers, service-providers, professionals and people with disabilities themselves.

-The Report promotes different approaches to meeting these challenges. It hereby links the rights based approach to disability with two fundamental components behind successful inclusion and participation - the community and empowerment. This notion has been a long standing tradition in developmental studies and has been previously included in the concept of Community Based Rehabilitation . Both components, community and empowerment, essentially capture from the very distinct individual perspective and broader life areas every aspect of a person's own resources within the family and community in interplay with the social, culture and economic context, and the disability. Rehabilitation of the individual and more specifically Physical Rehabilitation Medicine is impossible or completely ineffective without a prominent role of the community in any of its aspects - a fact the discipline has always recognized and reiterated recently .

Mediterranean Forum can be a very important common "table" to diffuse these contents, to exchange experiences and perspectives, to enrich the awareness and role for PRM specialists in this global attempt. Our close cooperation is the best basis to support one another's efforts .

**ASSESSMENT OF PERSONS WITH GAIT ABNORMALITIES IN PHYSICAL AND
REHABILITATION MEDICINE SETTINGS**

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The first step in the assessment of patients with gait abnormalities in physical and rehabilitation medicine settings is a clinical examination based on the International Classification of Functioning, Disabilities and Health. Body structure, activities and participation, and environmental factors (physical and human factors) must all be assessed. Qualitative and quantified assessments of gait are part of the activity and participation evaluation. Scales are also used to assess gait activities. Gait assessment tools can be used in laboratory environments for kinematic, kinetic, electromyographic and energy consumption analysis and other tools, such as videotape and walkways, can be used in clinical practice, while ambulatory assessment tools can be used to analyse patients' usual everyday activities. The aims of instrumental gait assessment are: to understand the underlying mechanisms and the aetiology of the disorders, to obtain quantified gait parameters, to define suitable therapeutic methods, and to follow the course of the disease.

ELECTRODIAGNOSIS OF THE RESPIRATORY SYSTEM

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Previously, the diaphragm was thought to be the only important contracting muscle during quiet breathing in humans. Now it is known that the diaphragm together with the scalenes and the parasternal intercostals are the primary inspiratory muscles, and that during expiration in most body positions except during lying the abdominal muscles and the transversus thoracis muscle (also called triangularis sterni or sternocostalis muscle) are regularly active, making quiet expiration an active process instead of a purely passive maneuver as was previously thought. The external intercostal muscles, the levatores costarum longi and breves muscles, the sternocleidomastoid muscle, and the serratus posterior superior and inferior muscles can be regarded as accessory inspiratory muscles. The pyramidalis and internal intercostal muscles are regarded as accessory muscles of expiration.

Several neuromuscular disorders, such as amyotrophic lateral sclerosis, Guillain-Barré syndrome, muscular dystrophies, myasthenia gravis, brachial neuritis, critical illness neuropathy, leprosy, metabolic disorders etc. can affect respiration, often in the critical care unit. Nowadays, electroneuromyographic techniques can be applied and can be of great value in more precisely determining the nervous system cause, if present, for respiratory failure or insufficiency.

Several electrodiagnostic techniques now are available to examine the respiratory muscles and their innervation. Nerve conduction studies of the phrenic nerve and intercostal nerves, and needle as well as surface electromyography of most respiratory muscles can be performed. To measure central conduction in order to assess the integrity of the corticospinal tracts and central respiratory drive magnetic transcortical and nerve root stimulation now can be performed.

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**ASSESSMENT OF THE NET EFFECT OF REHABILITATION AFTER SPINAL CORD INJURY
AND GENERALIZATION TO OTHER AREAS OF REHABILITATION MEDICINE**

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Introduction: To promote the quality of rehabilitation, decisions in rehabilitation should rely on quantitative assessment of the rehabilitation potential and of the actual achievements of rehabilitation. An original approach for assessing potential and achievements in rehabilitation medicine is proposed. This approach is based on defining observed variables as a fraction of their maximum possible value, while controlling for confounding factors. The spinal cord injury ability realization measurement index (SCI-ARMI), is presented as a model for the application of the proposed approach.

Materials and methods: SCI-ARMI represents the ability realization, defined as the ratio of the observed Spinal Cord Independence Measure (SCIM) III score, and the maximal possible SCIM III score, that reflects the relationship between task execution and ICF capacity. Three versions of the SCI-ARMI formula were developed. The last one is quadratic and based on the SCIM III values 95th percentile that represents capacities corresponding with given American Spinal Injury Association Motor Scores (AMS). This formula, was generalized for international populations, and adjusted for age and gender, based on data of 661 spinal cord lesion (SCL) patients, from six countries.

Results: The SCI-ARMI formula was found valid for large SCL populations from various countries. Age and gender affected its values ($p < 0.04$), but country information, did not ($p > 0.1$).

Conclusions: SCI-ARMI is a measure that assesses rehabilitation potential and achievements. It can be compared and summed up with other measures, which are presented as realization of maximal values, and contribute to evaluation of overall achievements of a person, a rehabilitation ward, or a hospital. The principles of this development can be generalized to other areas of rehabilitation medicine, and improve decision making and outcomes.

Key words: Quality assessment, effect of rehabilitation, ability realization, SCIM, SCI-ARMI

PL – 07

MEDITERRANEAN FORUM OF PRM – ITS PAST, PRESENT AND FUTURE

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The history of the MFPRM, established in Herzliya, Israel in May 1996, is to be presented.

Congresses followed each two years in different countries, always at the coast of the Mediterranean Sea.

The founders and the most active colleagues committed and dedicated to the idea of joint PRM future in the Mediterranean have been late Prof. Heim Ring and Prof. Nicolas Christodoulou.

From the beginning MFPRM had more support and recognition from the ISPRM, while official European bodies had some hesitations and doubts.

However, the idea of establishing international rehabilitation forums has extended with the Baltic PRM Forum and the European Forum for Research in Rehabilitation.

The importance of the rehabilitation medicine is growing, all over Europe.

The evidences, with special emphasis to the Mediterranean countries will be presented.

HAIM RING SCHOOL TO THE 10TH YEAR OF ACTIVITY

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The Euro Mediterranean School was founded in 2005 in Syracuse, where the school activities are located. The school was born as will of the Mediterranean Forum of Physical and Rehabilitation Medicine in association with the Scientific Societies of Rehabilitation, SIMFER in particular.

The charter members of the School, named Euro Mediterranean Rehabilitation Summer School (EMRSS), were: the national and regional SIMFER (Italian society of Physical medicine and Rehabilitation); the Archimedes University Consortium, the Megara Ibleo University consortium. Simultaneously with the School Charter, the regulation for the School functioning was approved, as well as the Board of directors with Dr. Francesco Cirillo, founder of the School, as the first President.

The School aims at implementing, on a biannual base, a highly specializing program addressed to young Medical trainees in Physical Medicine and rehabilitation. The program theme, chosen every year, is developed by major experts in the field and allows the trainees to improve their competence about the subject. Each year, the trainees are 40, 20 of whom as representatives from the Euro Mediterranean area are chosen by the presidents of the scientific societies of the different countries. The remaining 20 are Italians and they are chosen by the Directors of the Specialization Schools.

The program is for free and the students are hosted in affiliated B&BS, which are free of charge for them.

In November 2005, the first program was offered in Syracuse. The main topic was ‘Electromyography and the treatment of spasticity with the botulinic toxin’. In November 2006, the second program was organized. The theme was ‘Pain and Mobility’. In October 2007, the third program was about ‘High care and Rehabilitation’, with the active cooperation of the Civil Protection Service, the National military police of Rome, the Carabinieri RIS Corps and the Italian Red cross. In October 2008, the fourth edition was held with the theme ‘Prosthesis and orthotics in rehab’. In 2008, the school was entitled to Haim Ring, Israeli eminent scientist who co-founded the school and died prematurely. The top local regional and national authorities attended the ceremony, which was supported by the Israeli Embassy in Italy. Also in 2008, the board of directors approved the admittance of the Syracuse Sant’Angela Merici Foundation as an active member in the Association. As a result, the Foundation made didactic facilities and secretary personnel available to the School. As time went by, the sponsorship by ESPRM and ISPRM was granted. In 2009, the program topic was: “Spinal diseases”. For the first time, beyond the young doctors from the Euro Mediterranean area, trainees from Belgium and Poland were allowed in, indicated by ESPRM. The 2010 theme was “Stroke, from A to Z”; some military doctors from the Jordan army attended the course. In 2011 the topic was highly interesting on a scientific and social basis. It was about ‘Rare diseases, disabilities and rehabilitation strategies’. For the first time, it was sponsored by W.H.O., the Higher Health Institute of Rome, and Telethon, which sent their representatives. The innovation was the participation of U.E.M.S.S., which supported the students from Ireland and Hungary. In 2012, the program was not held in Syracuse because it happened to be at the same time as the 9th Mediterranean Forum of PRM Congress, in Sorrento. The opening of the Congress was, in fact, dedicated to the Euro Mediterranean School with the participation of many students but, above all for the first time, the former students of the school were the lecturers.

Up to 2012, so far the School has hosted beyond 300 trainees and 100 professors coming from the following countries: Portugal, Spain, Italy, Slovenia, Croatia, Bosnia, Montenegro, Serbia,

Albania, Greece, Turkey, Cyprus, Syria, Jordan, Israel, Tunisia, Egypt, Belgium, Poland, Ireland, Hungary, favoring cultural growth, exchanging experiences and growing friendship among people of different cultures.

This year, the program will start over again in Syracuse, with its 9th edition about: RECENT TRENDS IN SPINAL CORD INJURY REHABILITATION. The Program will be organized on October 21st to 24th 2013 and, for the first time, there will be a 'full immersion' session at the Catania Spinal Unit, the most important of southern Italy. 40 students from Euro Mediterranean area will be hosted as usual.

Therefore, we are moving towards our 10th year of activities in 2014. A big event will celebrate that: we are planning a convention where all of the trainees who attended the program during the 10 years will be invited. They will have the chance of meeting again in Syracuse where they first met and shared solidarity moments. Former students will be invited to talk about different topics. The professors who followed them with admirable dedication will moderate the event.

Syracuse! The most important centre of Greek culture in the Mediterranean area links its name to important characters of ancient arts and culture: Pindar, Aeschylus and Archimedes are only a few of them. Its human, cultural, architectural and artistic stratification makes Syracuse unique in the history of the Mediterranean Sea. Crossroads of civilizations, many different communities marked Syracuse history: from the Greeks, which founded it in 737 B.C. and made it so great as to compete with Athens itself, to the Romans; from the Byzantines to the Arabs; from the Normans to the Svevians, from the Angioinisi to the Aragonians, from the Spaniards to the Borbons. The town is universally known and today it is included in UNESCO's World Heritage List.

Syracuse is waiting for you! Between myth and legend, art and culture, landscape and good food, Syracuse welcomes young people, sharing magical moments with them, in the enchanting scenario of Ortigia.

All the information about the School and the snapshots about the previous programs are on our website www.emrssi.it (please visit it!).

DISABILITY AND THE FUTURE OF AN INTEGRATIVE, HOLISTIC, QUANTUM MEDICINE

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Rehabilitation Medicine is very often the “Final Common Pathway” (Sherrington) for many of the medical specialties, because patients with chronic health conditions end up being more or less disabled.

But what should we do for our patients when we have reached at a maximal medical improvement, the end of the FCP? What are the perspectives for the patient and the health professional from this point ahead? Are we satisfied with what we see, know, and with what we can do for our patients from this point on?

We will discuss the concept of Disability as it is explained in official International Documents, e.g. ICF, World Report on Disability, White Book of PRM, etc. As it has been often underlined in these documents and many other papers, disability is complex, dynamic, multidimensional, often contested; it is an evolving concept depending on societal, cultural, financial, religious realities.

Many papers and documents, including the WRD, have clearly shown that D is not an attribute of the person, but the result of the interaction between persons with impairments and attitudinal and environmental barriers that hinders the persons full participation in society.

Starting from this reality we will try to find possible matches of Rehabilitation Medicine and more unconventional approaches to healing: integrative, holistic and quantum medicine.

The result will be surprising!

THE CREATION OF THE MEDITERRANEAN FORUM OF PHYSICAL AND REHABILITATION MEDICINE (MFPRM) AND ITS ROLE TO THE DEVELOPMENT OF REHABILITATION TO THE MEDITERRANEAN COUNTRIES

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The lecture refers to the history of creation of the Society “Mediterranean Forum of Physical and Rehabilitation Medicine” (MFPRM) in 2000, its aims and its functioning through the years till today. How it was expanded from 14 initial members to more than 550 Mediterranean members. How it has contributed to the development of the Rehabilitation Services in the Mediterranean countries, through the organization of Mediterranean PRM congresses every 2 years, by organising interactive sessions for education and research and for adopting a model of Rehabilitation Services by the Mediterranean countries.

The MFPRM was created during the 3rd Mediterranean PRM congress in Athens in 2000, organized by Xanthi Michail. The idea was discussed four years ago, when the late Prof. Haim Ring asked pioneers from several Mediterranean countries to discuss the viability of such a Society. The first Mediterranean PRM congress was organized by Haim Ring in Herzliya of Israel in 1996 and the second by Ramon Gomez Ferrer and Antonio Hernandez Royo in Valencia of Spain in 1998. Since the creation of the Society they have been organized the 4th congress by Franco Cirillo in Syracuse (Sicily) of Italy in 2002, the 5th by Tansu Arasil in Antalya of Turkey in 2004, the 6th by Jorge Lains in Vilamora of Portugal in 2006, the 7th by Crt Marincek in Portorose of Slovenia in 2008, the 8th by Nicolas Christodoulou in Limassol of Cyprus in 2010, the 9th by Raffaele Gimigliano in Sorrento of Italy in 2012 and this year is organised the 10th congress by Milica Lazovic, president of the Serbian PMR Society, in Budva of Montenegro.

Many of these congresses were offered hosting the Interim meetings of the ISPRM and thus managed to attract experts in their own field of PRM from all over the World, contributing to the advancement of knowledge of the participants Mediterranean colleagues. Training in several workshops was contributing to the practical implementation of the new and classic knowledge.

The aims according to our Statute are: MFPRM to be the scientific Mediterranean body for physicians working in 3 Continents, Europe, Asia and Africa, around or with close vicinity with the Mediterranean Sea, in the fields of Physical and Rehabilitation Medicine. To facilitate Mediterranean exchange regarding research, projects, meetings and congresses. To influence national governments, in close co-operation with the national society of PRM by providing information to national governments about the contents and evidence based efficacy of PRM and disability issues.

The MFPRM is open free (no fees) to all qualified physicians specialised in PRM and to physicians being at the final stage of their PRM training who are working in any Mediterranean country or a country with close vicinity with Mediterranean Sea, irrespective of race, religion or community. The Society till now has members from the following countries: 1. Albania, 2. Algeria, 3. Bosnia, 4. Bulgaria, 5. Croatia, 6. Cyprus, 7. Egypt, 8. France, 9. Georgia 10. Hellas, 11. Israel, 12. Italy, 13. Jordan, 14. Lebanon, 15. Libya, 16. Malta, 17. Moldova, 18. Montenegro, 19. Morocco, 20. Portugal, 21. Romania, 22. Serbia, 23. Slovenia, 24. Spain, 25. Syria, 26. Tunisia and 27. Turkey. A Board contacts the works of the MFPRM and is consisted of seven active members and is elected every two years by the Council members of the General Assembly, organized during the biannual Mediterranean Congresses. The first president was Prof. Nicolas Christodoulou from Cyprus, who was succeeded in 2010 by Prof. Jorge Lains from Portugal.

The Society MFPRM adopted as official scientific journal “Minerva Medicophysica” and helped this journal, with the co-operation of the new Editor in Chief Stefano Negrini to change its title to “European Journal of Physical and Rehabilitation Medicine”, to become indexed and today

to have the highest impact factor among the journals of our specialty. The interested MFPRM members can be subscribers of the journal with a very low subscription fee.

Under the auspices and encouragement of the MFPRM, a School was created in Syracuse of Sicily in 2005 by Franco Cirillo. Every year the "Haim Ring Euro-Mediterranean PRM School" accepts for five days about forty young trainees or specialists during the first five years of their practice from all the Mediterranean countries. The participants attend both theoretical and practical sessions free and they only have to pay their flying tickets. The topics of the lessons are of current interest. Till now the topics of the School were: 1st 2005 General Concepts of PRM, 2nd 2006 Pain and mobility, 3rd 2007 Rehabilitation and High Care, Emergency Medicine, Osteoporosis, Oncology, Medicines, Physical Therapy, 4th 2008 Neurological Rehabilitation, Prosthesis & Orthosis, Biometrics, Physical Therapy, 5th 2009 Spinal Diseases and ICF, Functional Anatomy, Pathophysiology, Clinical Applications, Instrumental Diagnostics, Pain, Scoliosis, 6th 2010 Stroke from A to Z, 7th 2011 Rehabilitation in genetically and non genetically determined rare diseases, 8th 2012 Joined with the Sorrento Medit. Congress, 9th 2013 Recent trends in Spinal Cord Injuries Rehabilitation. For his invaluable services to the Society, Franco Cirillo was inaugurated by the General Assembly in 2008, as an honorary Board member.

The MFPRM created its own WEB SITE (www.mfprm.org), where the members can find all the current information for PRM, historic documents and details for the coming Mediterranean congress. Thanks to the Secretary Pr. Gulseren Akyuz and other Turkish colleagues a sponsor was found who covers all the expenses for the MFPRM web site.

The MFPRM has a long-term Action Plan, which is implemented through several committees, with the aim to develop the Society and mainly the Rehabilitation Services in all the Mediterranean Countries. These committees are for: Communication and Information (website, journal, newsletters), Scientific Events, Research projects, Contacts with Disabled People Associations, International Activities Co-operation, Mediterranean Clinical Guidelines and Educational Activities.

60 YEARS OF MEDICAL REHABILITATION IN SERBIA

Laslo Svirtlih

Serbia

In 1950 the United Nations adopted the resolution which officially promoted the postulates of rehabilitation for the disabled. Turning those postulates to practice was the issue of advisors and technical assistance, also offered by the UN.

The former Yugoslavia was among the first ones to ratify the UN and WHO accepted documents and also among the first to ask for assistance in this field. Dr Henry Kessler from New York was assigned, as an UN rehabilitation expert, to help form a rehabilitation facility in Belgrade and help in education of future rehabilitation team members. On the basis of the agreement between Yugoslavia and the UN, signed in 1952, the first facility for rehabilitation was formed in Belgrade. Its official name was "The Belgrade Center for Occupational Preparation of the Disabled". Official opening of the Center was in October 1952.

The last 60 years could be divided in following periods: from 1952 -1990; 1991 – 2000 and after 2000.

The first period (1952-1990) was the period of expansion of rehabilitation services on primary, secondary and tertiary levels. Our experts helped in organization of rehabilitation services and education in numerous countries in Africa as UN experts. In education of rehabilitation team members we were in good position: from 1923 at the School of Medicine in Belgrade Physical Therapy and Balneology had a Chair and a regular course in the curriculum of the School of Medicine. It changed later to Physical Medicine and Rehabilitation. With the help of our specialists Schools for Nurses took over the education of Physio and occupational therapists. Research was from the beginning a priority of our activities. Results of collaboration with our experts in basic research and biomedical engineering were internationally recognized and resulted in multiple research grants from USA and Europe.

The second period (1991-2000) was the period of civil war and international, not only economic, sanctions. The increase of demands for rehabilitation, because of large number of incapacitated and wounded civilians and soldiers on one side and devastated economy on the other side was a great challenge. We were deprived of any international help, international research grants, scholarships, even of publication of our articles in international journals.

The third period (from 2000 -). Efforts to overcome the lost ten years. To restore and improve the quality of our rehabilitation services by renewing our therapeutic devices, treatment protocols, improve the quality of education and legislation concerning rehabilitation. We have now in Serbia around 750 specialists of PRM, 3500 physio and occupational therapists, 10000 beds for rehabilitation on secondary and tertiary level, but these numbers alone do not guaranty quality. That is why one of our major goals all this past 13 years was to regain our positions in the international rehabilitation community because we hope that with joint effort, regional interaction, we can improve faster and better the rehabilitation services in our countries.

REHABILITATION AND BIOENGINEERING: HOW THEY MATURE TOGETHER

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The ultimate goal of the engineering implemented for rehabilitation is to improve the quality of life of subjects with sensory-motor impairment. At this point, there is no known rule which technique will work the best and the clinical studies and the feedback from the users are the only measure of the success.

In rehabilitation of movements the aim is to activate joints in a way to restore sensory and motor function as much as possible in humans with sensory-motor impairments. The biological organisms have evolved control systems to suit many of species and physiological functions, while the engineering resulted with very sophisticated methods that are appropriate to suit man-made systems. The two streams are converging in the area of rehabilitation.

This presentation proposes the integration of the two strategies. The strategies implemented in most of rehabilitation devices have so far been fairly simple, and have been developed largely in relation to the design of machines rather than to the design of nervous systems. Recent developments in bioengineering benefit from the neurophysiological findings and fast grow of computing power and are converging to those in analogous natural systems. Neurorehabilitation is where the two strategies meet. Neurorehabilitation is a method that allows the preserved structures to find their best use if appropriately trained. The intensive, task dependent training shows dramatic effects in the rehabilitation of humans with disabilities and this is facilitated with appropriate modern technology.

Neural engineering is where the ultimate successes is coming. The development of new implantable devices that interface directly the central and peripheral nervous system, strengthen by wireless communication, opens new horizons. The implanted technology and micromachining make dramatic impact and provide that has been difficult to imagine, yet the intelligent control that resembles to natural control is the link that would make this approach into an effective rehabilitation treatment.

In parallel, the current technology allows the quantified assessment. This assessment is necessary to objectively measure functional impairments and identify the biomechanical and neurophysiological changes caused by the injury or disease. This facilitates essential customization of a rehabilitation systems for specific needs of individual patients.

WHICH MEASURES OF BALANCE AND GAIT PREDICT FUNCTIONAL INDEPENDENCE AFTER INPATIENT REHABILITATION FOR ACQUIRED BRAIN INJURY?

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Introduction: Balance and walking are considered important for regaining independence after acquired brain injury (ABI), thus, considerable efforts during in-patient rehabilitation are dedicated to improving balance and gait. It is less clear, however, whether how balance and gait are related to functional independence on admission and discharge. These relationships are confounded by a selection of outcome measures used for assessing balance, gait, and independence. Thus, the goals of this study were to determine the relationship between balance, gait, and functional independence on admission and discharge, and whether balance and gait on admission can predict improvements in independence after inpatient rehabilitation for ABI.

Materials and methods: Twenty-four subjects (19 women) with ABI due to trauma (20) or hemorrhagic stroke (4) were included during a one-year period. Balance was assessed by the Trunk Control Test (TCT), Upright Equilibrium index (UPEQ), and Berg Balance Scale (BBS). Gait was assessed by walking FIM score (wFIM), self-selected gait speed (GS) manually measured over a 10-meter distance, and distance walked during 5 minutes (5minD). Functional independence was assessed by FIM, namely wFIM, motor FIM (mFIM), and total FIM (tFIM). All measures were taken by the same physical therapist on admission (18 ± 7 days post-injury) and at discharge (27 ± 22 days post-admission). Correlation and stepwise multiple regression were used for statistical analysis with adjustments for the time from onset to admission and the length of stay, as appropriate.

Results: On admission, TCT, UPEQ, BBS, GS, and 5minD positively correlated with wFIM. In univariate analyses, the gain in wFIM negatively correlated with admission UPEQ and GS, the gain in mFIM positively correlated with 5minD, as did the gain in tFIM with TCT, BBT, GS, and 10minD. In the final regression model, the gain in wFIM was best predicted by admission wFIM and 5minD ($R^2=0.57$), the gain in mFIM by admission mFIM, BBS, and 5minD ($R^2=0.82$), and the gain in tFIM by admission mFIM, BBS, and 5minD ($R^2=0.83$). Significant predictors of the gain in GS were admission tFIM and TCT ($R^2=0.43$), whereas significant predictors of the gain in 5minD were admission tFIM and BBT ($R^2=0.35$).

Conclusions: Balance and walking are related to several domains of functional independence after controlling for the time from onset to admission and the length of rehabilitation stay. Admission BBT and 5minD were the most common predictors of increase in functional independence at discharge. Balance and walking on admission better predict an increase in independence during inpatient rehabilitation than do balance and independence on admission predict improvements in walking.

Key words: balance, gait, functional independence, brain injury, stroke

DIAGNOSTIC AND PROGNOSTIC RELEVANCE OF NEUROPHYSIOLOGICAL FINDINGS IN PEDIATRIC REHABILITATION

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Introduction: In children of different age it is important timely to recognize causes of various pathological conditions. This will enable prompt and adequate inclusion of these patients into proper rehabilitation treatment. At birth most frequent pathology refers to congenital anomalies and birth trauma, while in older children neuromuscular diseases are frequently present as well as trauma associated with complications. The aim of our study was to evaluate and present diagnostic and prognostic relevance of neurophysiological findings in pediatric population for the purpose of timely induction of adequate rehabilitation program in order to achieve better functional status and improve quality of life.

Material and methods: We have evaluated children referred to University Childrens Hospital (UCH) in Belgrade for treatment due to the various pathological conditions age from 0-18 years of life. After clinical (neurological, neurosurgical, orthopedic, cardiological, urological) evaluation followed by radiology and imaging diagnostics, neurophysiological evaluation was applied. At UCH we are performing electromyography (EMG) in early days and weeks after birth, electroneurography (motor conduction velocity – MCV and sensitive conduction velocity – SCV) and evoked potentials (EP) (somatosensory - sSEP, visual - VEP and auditory - BAEP) after two months of life, according to the peripheral and central dysfunction.

Results: We have demonstrated that EMG evaluation is of great importance in estimation of peripheral motor nerve lesions degree and level particularly in early days of life in obstetrical plexus brachial lesions, radial and peroneal lesions or neuromuscular diseases. In older children, due to the disease condition and injury time, EMG was performed. EPs (sSEP, VEP, BAEP) are useful tools in estimation of dysfunctional degrees for afferent pathways and central nervous system (CNS) disorders and lesions. EPs are helpful in evaluation of coma degree and possible brain death. There is significant role of MCV and SCV evaluation in diagnostics of peripheral nerves integrity, especially in subclinical form in metabolic and oncological patients. This is valuable in preventing further progression of dysfunctions and diseases course. These findings are helpful in rehabilitation treatment planning and are valuable source for recovery prognosis and follow-up over treatment course.

Conclusion: Neurophysiological evaluation is used for differential diagnostics of myopathies and neuropathies and for conditions to delineate central from peripheral neurogenic lesions. It should be underlined that different neurophysiological methods are useful in children as sensitive tools and of great importance in evaluation of presence, degree and level of dysfunction. Their findings could be used as prognostic parameters for treatment outcome or progression and for indication of other treatment methods.

Key words: neurophysiology, diagnostics, rehabilitation, children

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CHILDREN SUFFERING FROM ACQUIRED BRAIN INJURY

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Acquired brain injury (ABI) is one of the most important causes of mortality and severe disability among children. Children with ABI can suffer from a wide number of disorders that increase their disability in various fields of functioning, impacting, as well, on their integration and full participation within their family, school and society. During the acute, post-acute and long-term settings, the role of the Physical Medicine and Rehabilitation specialist (PRM specialist) has been identified. The different settings where a PRM-specialist has to work among these patients in all phases of the recovery process are described here, during the hospital stay and after discharge in the long term, as well as in preparing for discharge. Although their presence is important in all three settings, it is during the post-acute and long-term follow-up, where PRM expertise is particularly important. An interdisciplinary team of different professionals is also necessary in order to obtain the best results and PRM specialists are well placed to lead with it.

**PHYSICAL THERAPY MODALITIES AND REHABILITATION TECHNIQUES IN THE
MANAGEMENT OF NEUROPATHIC PAIN**

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Neuropathic pain is an important problem because of its complex natural history, unclear etiology, and poor response to standard therapies. It affects the quality of life and activities of daily living in a negative way, and creates severe difficulties in both professional and personal life. It also causes psychological problems resulting in sleep disorders, anxiety and depression. There are some consequences associated with neuropathic pain like deterioration in sexual and marital life and family relationships which lead to social isolation. These problems increase over time, which in turn worsen the pain causing a vicious circle. Neuropathic pain also has a bad impact on the economy such as considerable loss in working days, disability and increasing healthcare costs. Therefore, neuropathic pain must be approached as a big health problem that have to be resolved as quickly and as efficiently as possible. The primary goals of the management of neuropathic pain are to detect the underlying cause, define the differential diagnosis and eliminate risk factors. Co-morbidities and psychosocial factors, which can be related to pain, should also be evaluated. In a well-designed multimodal management plan of neuropathic pain, physical therapy modalities such as superficial and deep heat agents, analgesic currents and laser, and rehabilitation techniques such as cognitive behavior therapy, psychotherapy, relaxation therapy, and virtual reality are also important options and should be combined with pharmacotherapy in daily practice. Pain rehabilitation techniques are gradually gaining importance in the management of neuropathic pain. The emotional component of neuropathic pain is more striking and can not be controlled by pharmacotherapy alone. Rehabilitative methods which are effective in treating pain behavior, increase overall treatment success. However, it is now early to comment on these methods due to the lack of adequate publications. We have suggested that the importance of pain rehabilitation techniques will increase in time and they will have a larger part in the management of neuropathic pain.

ASSOCIATED RISK FACTORS OF INCREASED PEAK PLANTAR PRESSURE IN A COHORT OF PERSONS WITH DIABETIC NEUROPATHIES. A TRANSVERSAL STUDY

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Introduction. Elevated peak plantar pressure (PPP) is a risk factor of foot ulceration among persons with diabetic neuropathies (PwDN) and diabetic foot.

Objectives. To detect general, structural and functional associated foot risk factors of elevated PPP, in a cohort of PwDN, with the intention to prevent diabetic foot ulcer.

Material and Methods. An observational and transversal study of a 67 PwDN sample was conducted, between 2010 and 2012, at the Department of Rehabilitation of the Hospital of Requena, Spain. Inclusive criteria were range of age between 30 and 80 years old, length of diabetes mellitus course over 5 years, Neuropathy Symptom Score over 2, Neuropathy Disability Score over 4, inability to detect a 5.07 Semmes-Weinstein 10 mg monofilament on the plantar foot over 3 areas. Exclusive criteria were plantar ulcers or previous ulcers, lower limb amputation, signals of lower limbs ischemia, impairment that might lead to other neuropathy and/or to inability to walk without assistive device on level surfaces. Evaluation of length of DM course, antropometrics, feet structure and function, including finger deformity, callus, range of movement limitation in ankle and foot, and free cadence walking with Biofoot/IBV baropodometrics system was conducted. Intervention group showed PPP over 900 Kpa in forefoot. Control group, below 900 Kpa. Intervention group participants were prescribed off-loading forefoot orthotics whenever presenting associated foot deformity, and adequate footwear, in order to decrease PPP below 900 Kpa under forefeet. Education measures regarding prevention of diabetic foot ulcer were delivered to every patient at the entrance of the study. Participants were evaluated during three-trial sessions without and with the orthotics and adequate footwear.

Results. Intervention group participants with PPP over 900 Kpa under forefeet showed finger deformity, mostly claw fingers, and hyperkeratosis under metatarsal heads significantly higher than control group. These patients showed an average reduction of 34.21 % of PPP under forefoot when using the orthotics. No participant developed plantar ulcer during this study.

Conclusions. The study confirms that structure deformity of foot is a risk factor of increased PPP among PwDN, and thus evaluation of PwDN with diabetic foot is recommendable to detect these risk factors, and that off-loading forefoot orthotics are effective to decrease PPP under forefoot. Further research is required to evaluate whether maintaining long-term PPP below 900 Kpa under forefeet, controlling results with Biofoot/IBV baropodometrics system, would contribute to avoid development of plantar ulcers among this cohort of patients.

Key words. Diabetic neuropathies, diabetic foot, ulcer prevention, baropodometrics system

NEUROMUSCULAR MANIFESTATIONS IN THE UPPER LIMB IN PATIENTS USING CANES, CRUTCHES OR WALKERS

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Walking aids (including crutches, canes and walkers) are used by patients with disability of the lower limbs to provide stability and support, to assist walking and to decrease stresses imposed on the lower limbs. Therefore, they are frequently used by patients with weakness (i.e. stroke, paraparesis, quadriparesis, myelopathy, neuropathy, myopathy and anterior horn cell diseases), pain (e.g. arthritis, avascular necrosis,...) and/or injuries (i.e. fractures, ligamentous injuries, amputations, following surgery, ..) of the lower limbs.

Walking aids provide physiological and psychological advantages that a person cannot achieve by sitting or using wheelchair mobility. The use of walking aids help people with disabilities to move around freely. Standing and walking prevent joint stiffness, avoid disuse weakness, stimulate proper bone growth, prevent osteoporosis, reduce urinary tract infections, improve blood circulation, prevent postural hypotension and reduce pressure sores. However, walking aids may cause some complications including: compression neuropathy (of the median, ulnar and radial nerves), epicondylitis of the elbow, tendinitis/tenosynovitis (at the shoulder and hand) and osteoarthritis (of the glenohumeral, acromioclavicular, elbow and hand joints).

In a study done in Alexandria University Hospitals on 53 non-diabetic walking aid users (for a period of >2 months and up to 30 years), there was increased prevalence of shoulder pain, elbow pain, hand pain, epicondylitis, osteoarthritis of the acromioclavicular joint and carpal tunnel syndrome among walking aid users compared to a control group (of non-diabetic non-walking aid users of matching age, sex and occupation). Also, osteoarthritis of the 1st carpometacarpal joint was more common among unilateral crutch users than among those using the walking aid by both hands (i.e. in bilateral crutch users and in those using walkers). Besides, these complications were more common among ladies than men. Also, these complications were common among those with increased body weight, those with longer duration of walking aid use and those having a walking aid of inappropriate length.

Therefore, it seems that some of these complications could be prevented by prescribing the appropriate walking aid for each patient (regarding its type and length); reducing the patient body weight; and training the patient for using it. The physiatrist should be aware about these complications not only to prevent it, but also to diagnose and treat it early.

REHABILITATION OF PERSONS FOLLOWING UPPER LIMB AMPUTATION

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Rehabilitation of people following an upper limb amputation has to start immediately after the injury or in cases of planned surgeries even before the surgery. It has to be done at all levels of human functioning, e.i. body function (desensitization, pain control, restoration of full range of movement (ROM), muscle strength) and structures (surgery and selection of amputation level, wound healing and scar management, oedema control, stump shaping, and posture), activities and participation (training of independence in basic activities of daily living (ADL) without prosthesis and with a temporary prosthesis, training of some other personally important and meaningful activities), personal (education, employment and personality) and environmental factors (drugs, prosthesis, time from the amputation to the first prosthetic fitting, adaptations of clothes and other things, utensils, cultural background, attitudes of professionals, involvement of family and other people in prosthesis selection and support of different organisations) (1, 2).

The key to successful rehabilitation of people following upper limb amputation is teamwork (3) which improves short- and long- term outcomes (4, 5). The team consists of the patient and his or her family, surgeons experienced in upper limb amputations, specialists of physical and rehabilitation medicine (PRM), nurses, occupational therapists (OTs), physiotherapists (PTs), certified prosthetist orthotist (CPOs), psychologists, social workers, vocational counsellors, and others, all with special knowledge and experience in rehabilitation of people following upper limb amputation. Recommendation B (good practice) of British guidelines for amputee and prosthetic rehabilitation is that experienced clinical counselling and psychological support should be available for all upper limb amputees (6).

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RESULTS OF THE SURVEY ON THE USE OF ICF IN EUROPEAN COUNTRIES

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Introduction: Section of Physical and Rehabilitation Medicine (PRM) is one of 39 sections of UEMS (European Union of Medical Specialists). ICF (International Classification of Functioning, Disability and Health) was approved by WHO in 2001 and since that time it has been target of PRM specialists for research and application in clinical practice. Its principles were also included in the “White book of PRM in Europe”, published in 2006-7. In March 2012 the suggestion was approved by PRM section to prepare survey about the use of ICF in separate European countries. The questionnaire was distributed in April 2012 and answers came afterwards.

Materials and methods: Questionnaire included 19 questions. All respondents were delegates of their countries in PRM section; therefore their answers should give reliable information, though subjective bias is not fully excluded. Unclear answers were later individually discussed.

Results: Delegates of 36 countries answered. 33 of them sent filled questionnaire. In 3 countries ICF is not used. English original was translated to 25 other European languages and mostly published as a book in years 2001 – 2010, maximum in 2004. It is commonly used for evaluation in the health care only in 8 countries, and even there with limitation. It is more often used in PRM departments. Evaluation is done mostly by physicians (in 27 countries), partially also by other medical specialists: physiotherapists in 18 countries, occupational therapists in 16 countries. ICF is used for evaluation also outside of health care, in social services in 15 countries, in schools in 7 countries and in vocational rehabilitation in 15 countries. Also simplified versions of ICF are known: ICF check list is used in 15 countries, ICF core sets for different health conditions are known in 14 countries and together 18 core sets were named, most common is core set for stroke. In 10 countries exists a document, which makes the use of ICF compulsory, but it does not exist in 22 countries. In 22 countries are organized courses of ICF use. Research about application of ICF has been realised in 21 countries.

Conclusions: Our survey shows, how much work was done for translation of ICF to native languages, in the research and during its clinical application. It demonstrates large difference between European countries. During all last 12 years effort was done to modify and simplify it. This work continues through the activity of ICF Revision Steering Group of WHO. Our results show, that not all this effort was transferred into clinical practice to improve the quality of medical care. It demonstrates also example of ICF core sets, which are not generally used. Translation of ICF to different languages could be also the basis for unification of terminology in PRM.

Key words: International classification of functioning (ICF), ICF core sets, European Section of Physical and Rehabilitation Medicine

ADVANCE IN PRM DIAGNOSTIC

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In recent time polymorphism and genetic diagnostic is very popular.

This kind of diagnostic now is also in the point of interest in rheumatoid arthritis, osteoarthritis, enclosing spondylitis, in progression of joint damage in rheumatoid arthritis even in low back pain. This kind of diagnostic could mark a patient with predisposition of this kind of disease and we in PRM now could not only treat patients with clinical signs of diseases, but also we can do in primary and secondary prevention. This kind of diagnostic also is useful in genetic treatment with biological therapy.

Despite of this sophisticated and very expensive diagnostic we do not do as we can diagnostic in neuromuscular ultrasound.

Neuromuscular ultrasound is non invasive diagnostic procedure which is can help for diagnostic or differential diagnostic in lesion of peripheral nerves, muscle, brachial plexus motor neuron diseases myopathies be helpful in interventional procedures.

BRAIN CONTROL OF ASSISTIVE DEVICES

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Introduction: Brain Computer Interface (BCI) systems can translate particular thoughts into the control signals of the device/computer. Various mental tasks or external stimuli induce changes in the spontaneous neural activity which can be identified by measuring brain signals. Intention is, thus, directly assessed without common output pathways of the spinal and peripheral motor system. As a result BCI may guide traditional bodily effectors such as keyboard/mouse, wheelchair, prosthetic arms or exoskeleton. When BCI users are provided with information on their performance, they have an opportunity to further modulate the brain activity in order to gain better control of the system – *neurofeedback*.

Originally, the target populations of BCI were the patients with severe neuromuscular disabilities; however, with recent advances in BCI technology, the range of applications of such systems has expanded to four main areas: communication and control, motor substitution, motor recovery and entertainment. Monitoring, analyzing and decoding brain activity of BCI user online may serve in more broader and more general sense as a new tool to better understand brain functions.

Invasive/noninvasive BCI: Invasive, as well as non-invasive brain recordings are available for BCI systems. Spike trains from single neurons, or extracellular recordings by multi-field arrays (probes) provide focused metrics of brain activity, uncontaminated by bio-electric signals outside the brain. For example, Local Field Potential (LFP) from neuronal populations in the motor cortex of primates has been used to predict arm movements and to control a prosthetic arm. The drawback of such systems is diminished precision because activity coming from only small number of brain regions is recorded. Electrocorticography (ECoG), on the other hand, measures wider brain activity from brain surface with a grid (around 20 cm²) over a lobe. The most common technique, electroencephalography (EEG), acquires brain activity over scalp in noninvasive manner. EEG measures voltage changes on the scalp due to electrical brain activity. The limitation of EEG for BCI application is its low spatial resolution (1 cm). BCIs may operate through brain signals such as event-related brain potentials (ERPs), Magnetoencephalography (MEG), real-time functional Magnetic Resonance Imaging (fMRI) and Near Infrared Spectroscopy (NIRS). Although semi-invasive, in the current state of the art, ECoG are favorable for BCI applications.

In the recent classification of BCI devices, active or passive BCIs are recognized, depending on whether the control of the system is voluntary or involuntary. Examples of passive BCIs are EEG based lie detector or drowsiness detector for drivers, which operate without or in spite of the subjects' will.

Main strategies in BCIs for rehabilitation: One approach is to use assistive or substitutive strategies, which are technologies and modalities used to bypass an interrupted neural pathway or connection. In these cases BCI technology promotes limb movement or/and muscular activation by means of neuroprostheses (functional electrical stimulation devices) or robotic control to perform daily living activities. No direct and specific motor function recovery is promoted explicitly because the cortical activity is used only to operate an external device. In cases of permanent injury, such as SCI, this may be one of the few possible alternatives. The second strategy uses a classical conditioning approach, attempting to promote neuroplasticity and consequently motor functional recovery. This strategy provides a *neurofeedback* training process to modulate the specific cortical activity in the affected brain region. It is based on coupling a conditioned stimulus and an unconditioned stimulus attached to a response in a Habbian manner to produce neural plasticity. For successful BCI adaptation it is necessary that using BCI is easy and with known accuracy.

Key words: Brain Computer Interface, assistive devices, EEG, neurofeedback, neuroplasticity

INTRATHECAL BACLOFEN THERAPY FOR TREATMENT OF CNS SPASTICITY

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Introduction: In some patients severe spasticity of cerebral or spinal origin can not be treated successfully with conventional oral medication or physical modalities. Intrathecal baclofen therapy with implanted pump represents effective treatment from mid-80's. Baclofen (Lioresal) is a muscle relaxant and potent GABA agonist that acts via GABAB receptors at the posterior columns of spinal cord level, to inhibit the release of excitatory neurotransmitters by inhibiting calcium ions influx into presynaptic terminals. This direct binding on spinal cord receptors leads to higher efficiency compared to peroral therapy in which baclofen does not pass the brain-blood barrier. Intrathecal Baclofen Therapy (ITB) involves the long term delivery of Baclofen to the intrathecal space surrounding the spinal cord for the purposes of relieving severe spasticity. This delivery method of Baclofen is used when oral medication or conventional physical therapy no longer manages the spasticity sufficiently, and the spasticity has an impact on the quality of life of the patient.

The benefits of ITB to the patient are well documented, and typically reduce muscle spasms, tone and pain. This in turn increases mobility, independence, stamina, sleep and an overall increased quality of life. In addition to the patient benefits, there is also a reduced workload for care by patient caregivers and family members.

Since ITB therapy, as a part of broader neuromodulation therapy, is regarded as functional treatment, interdisciplinary approach is necessary for building a successful center and achieving a long term therapeutic goals. As rehabilitation medicine specialist is only holistic oriented specialist, with knowledge of functional assessment, it is recommended that therapeutic process is coordinated by the PRM specialist.

Key words: Intrathecal baclofen pump, spasticity, central nervous system lesion, rehabilitation

REHABILITATION OF PARKINSON'S DISEASE. EVIDENCE BASED CONCLUSIONS

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INTRODUCTION: Parkinson's disease (PD) is a progressive neurodegenerative disorder with many negative effects on patients and their families. Physiotherapist is a member of multidisciplinary team in treatment of PD with the aim to maximize functional ability and reducing secondary complications. This is achieved through education and support for movement rehabilitation.

METHODS: Search and analyse of review studies published in Pubmed was performed, and statistical data were evaluated.

RESULTS: According to review studies it seems that: Benefit for physiotherapy in PD was found in most outcomes over the short-term, but was only significant for velocity, two- or six-minute walk test, step length, Timed Up & Go, Functional Reach Test, Berg Balance Scale and clinician-rated UPDRS. Most of the differences were small. But for some outcomes (e.g. velocity, Berg Balance Scale and UPDRS), the differences observed were at, or approaching, what are considered minimally clinically important changes.

CONCLUSION: Further implications are: There is a need to develop a consensus as to 'best-practice'. Large well designed placebo-controlled RCTs are then needed to demonstrate the efficacy and effectiveness of 'best practice' physiotherapy in Parkinson's disease. The stage of the disease at which the physiotherapy is given should be specified at the outset. Outcome measures with particular relevance to patients, carers, physiotherapists and physicians should be chosen and the patients monitored for at least six months to determine the duration of any beneficial effects.

Key words: Parkinson's disease, physiotherapy, review

NEW TRENDS IN REHABILITATION OF PATIENTS WITH PARKINSON'S DISEASEMirko M Grajić^{1,2}, Lazović PM³, Kostić SV^{1,4}¹School of Medicine, University of Belgrade, ²Physical and rehabilitation medicine clinic, Clinical Center of Serbia, ³Institute for rehabilitation, ⁴Neurology Clinic, Clinical Center of Serbia, Belgrade, Serbia

Introduction: During the progression of PD, mobility is progressively constrained by rigidity, bradykinesia, freezing, sensory integration, inflexible motor program selection and attention and cognition. They experience difficulty in modulating gait parameters in response to tasks demanding changes. Mobility requires dynamic neural control to quickly and effectively adapt locomotion, balance and postural transitions to changing environmental and task condition. While the pharmacological treatment of Parkinson disease is essential, many systematic reviews have reported positive effects of physiotherapy and exercise as rehabilitation technics on the motor and non motor signs and symptoms of PD. Recent studies suggesting that exercise may exert neuroprotection, slow, stop or reverse the neurodegenerative process and promote neurorestoration, adaptation of compromised signaling pathways. The inability to simultaneously carry out a cognitive task and a balance or walking task has been found to be a predictor of falls in elderly people.

Materials and methods: Data analyze of the research studies and reviews of the literature available on the NLM Pub Med, Medline, Current Contents databases and the first results of systematically structured performed physical rehabilitation treatment (PRT) of inpatient patients in Neurology Clinic of Clinical Center of Serbia.

Results: Parkinsonian Rats that ran on a treadmill showed preservation of dopaminergic cell bodies and terminals associated with improved running distance and speed. Cohen demonstrated that a potent neurotrophic factor for the survival of DA neurons, glial cell line-derived neurotrophic factor (GDNF), was upregulated in the striatum corresponding to the exercised limb. Exercise has been shown to induce generation of GDNF producing cells (glia) in the substantia nigra DA cells period of inactivity or stress may reverse the protection and behavioral benefits of exercise. Decreased physical activity, which is often a precursor of the diagnosis of PD and worsened by the symptoms of bradykinesia, fatigue or weakness, may be prodegenerative. Tillerson revealed that inactivity is not only a symptom of PD, but a catalyst in the degenerative process. Rehabilitation aim in PD is ability to quickly switch motor programs when environmental conditions change, and the ability to maintain safe mobility during multiple motor and cognitive tasks. Specific rehabilitation treatment recommendations included: cueing strategies to improve gait and reducing possibility of fall; cognitive movement strategies to improve transfers; exercise to improve balance; training of joint mobility and muscle power to improve physical capacity. Rehabilitation should include complex, multisegmental, whole-body movements and tasks requiring quick selection and sequencing of motor programs such as practicing postural transitions (e.g., moving from stance to the floor, rolling, and arising from the floor to stance). Cognitive Constraints and Task-specific exercises-progress task difficulty by adding cognitive or motor tasks that teach patients with PD to maintain postural stability during performance of secondary tasks. Repetitive transcranial magnetic stimulation (rTMS) of the brain has been shown to modulate cortical excitability. Combinations of rehabilitation therapies with rTMS might enhance the therapeutic effects. The new findings suggested that combination of rTMS and treadmill training enhances the effect of treadmill training on modulation of corticomotor inhibition and improvement of walking performance in those with PD.

Conclusions: New neurorehabilitation approach routed towards highly individualized structured combined rehabilitation program which include gait diagnostic and gait rehabilitation, cardio metabolic assessment with energy costs calculations, protocols of aerobic and resistant and range of motion training and specific functional aims defined by functional limits every specific patient. Over the time rehabilitation includes progressive levels of sensorimotor, resistance, and coordination challenges that can be costumed for each patient.

Key words: new trends, rehabilitation, Parkinson's Disease

URODYNAMICS AS AN USEFUL TOOL IN EVALUATION AND PROGNOSIS OF CLINICAL SIGNS AND SYMPTOMS OF OCCULT SPYNAL DYSRAPHISM

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Introduction: Spina bifida occulta (SBO) is characterized with wide entity of spine anomalies and neurological impairments, among them voiding dysfunction. Beside dysphunctional voiding these children present with incontinence, enuresis or constipation. Voiding dysphunction could be the only sign of SBO, but often such pathology could be associated with other symptoms that are related to SBO. The purpose of this study is to evaluate the importance of urodynamic findings in early detection of SBO complications as well as its role in prognosis and treatment of children with dysfunctional voiding.

Material and methods: We evaluated 140 children with SBO age between 4-14 years that were hospitalized and treated at University Children's Hospital in Belgrade. All participants were divided into 3 groups: First group composed 40 patients with dysphunctional voiding without apparent symptomatology related to SBO. Second group composed 60 patients with dysphunctional voiding and present stigmata (hyperthrihosis, fovea spinalis, gluteal line asymmetry, hipo/hyperpigmentation, lipoma). Third group composed 40 patients with present stigmata and clinically verified locomotor deformity (hip, foot, spine). Entire study group underwent urodynamic evaluation. Furhter parameters were analyzed: frequency, urgency, detrusor sphincter dyssinergy, rezidual urine.

Results: There is significant statistical correlation between dysphunctional voigind and presence of stigmata in SBO patients with clinical symptoms progression (tethered cord syndrome, deformity on locomotor system) ($p < 0.05$). In patients with present stigmata in higher proportion was noticed the existence of dysphunctional voiding as well as SBO. Patients with isolated symptom of dysphunctional voiding did not show significant presence of SBO ($p > 0.05$).

Conclusion: We have demonstrated that urodynamics could be usefull tool in diagnosis and prognosis of SBO and dysphunctional voiding in children. Parameters gained by urodynamic evaluation could be useful in determination of bladder type dysphunction (hypotonic and hypertonic) enabling timely and adequate introduction of physical therapy and medical treatment.

Key words: spina bifida occulta; urodynamics; voiding dysphunction; children

SCOLIOSIS AND SPORTS

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Introduction. Scoliosis is a general term comprising a heterogeneous group of conditions consisting in changes in the shape and position of the spine, thorax and trunk with prevalence of up to 2% (3%) of the population. It can be defined as a “three -dimensional torsional deformity of the spine and trunk”. Scoliosis can become more pronounced during the growth and development, especially in school children, under the influence of various internal and external factors. “Structural scoliosis” must be differentiated from “functional scoliosis”, that is a spinal curvature secondary to known extraspinal causes. It is usually partially reduced or completely subsides after the underlying cause is eliminated. Idiopathic scoliosis is a structural and lateral curvature of the spine for which a currently recognizable cause has not been found and there is no basic evidence for physical and radiographic pathology.

Complications. Untreated adolescent idiopathic scoliosis can progress and result in back pain, impaired lung capacity and psychosocial disorders due to the cosmetic appearance of the deformed trunk. Over the long term, patients suffer impairment of their sports activities compared with age-matched controls.

Physical and sports activities. There are different results in literature about the effect that various sports can have on the prevalence of scoliosis in children. Sports have often been considered to be a causative factor of musculoskeletal perturbation, or on the other hand are recommended as a treatment option for adolescent athletes who are engaged in certain athletic activities. The various sports, in addition to positive, have a negative influence on the musculoskeletal system with appearance of various disturbances. Scoliosis has been found in one study in up to 80% of athletes with an asymmetric load on the trunk and shoulders, such as javelin throwers and tennis players. The patients with scoliosis should be encouraged to actively take part in sports activities. It is reported that children who were not actively involved in sports activities had significantly higher probability of poor posture than children performing sports. Several studies suggest that systematic exercising and participating in sports activities is probably not associated with the development of scoliosis. Potential association between elite-level competition in specific sports at an early age and an increased prevalence of scoliosis has been reported (grade C recommendation). Positive influences on the general fitness including the lung function, strengthening of the trunk muscles and on the psyche can be expected.

SOSORT recommendations. Sports are recommended because of the specific benefits they offer to patients in terms of psychological, neuromotor and general organic well-being. During all treatment phases, physical education at school is continued. Sports activities are continued also during brace treatment and restrictions may be placed on practicing certain types of sports activities. During brace treatment, contact or highly dynamic sport activities are performed with caution and competitive activities that greatly mobilize the spine are avoided in patients with scoliosis at high risk of progression.

DOES PHYSICAL THERAPY HAVE ANY EFFECT ON DISEASE ACTIVITY OF RHEUMATOID ARTHRITIS?

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Drug therapy is the only treatment that has an effect on the activity of rheumatoid arthritis (RA). On the other hand, as a generally accepted opinion, drug therapy and physical therapy (PT) affect functional ability. There are no studies that tell about the possibilities that PT decrease inflammation, but there are many that prove that drug therapy, without PT can increase functional ability. Can this be objected? It can, but it must be documented by quality studies.

The aim of this study was to examine the validity of widely accepted claims. The main characteristic of RA is symmetrical pain, swelling and limitation of movement. Swelling is the result of increased amount of synovial fluid, which is a consequence of inflammatory activity. Joint pain develops due to stretching of joint capsule that is rich in sensitive fibers. Measure of disease activity are painful and swollen joints, the parameters of the acute response (SR or CRP) and evaluation of patient's general condition using a visual analog scale (VAS), all of which becomes part of the disease activity score (DAS or DAS 28)¹. It is a joint clinical index of RA activity, which indicates the current disease activity². Today, each study that examines the effect of different drugs as a measure of RA activity use DAS. Although each study has a number of exclusionary criteria that has an aim to provide objective research, i.e. to exclude any doubt that achieved reduction in DAS score is exactly the effect of the examined drug.

Never excluding criterion was the use of PT during the study, suggesting that the researchers do not give any importance to its effect on pain and swelling in patients with RA. Physiatrists have known for a long time that the PT does not achieve only increase in range of motion and muscle strength, but also there is a significant reduction in pain and swelling of the joints, but sadly it is not published. For this purpose, a study has been done at the Department of physical medicine and rehabilitation in Tuzla with the aim to determine the effect of PT on DAS 28 (with 28 joints)³. It showed that there was a significant reduction in the number of painful and swollen joints, as well as of patient's evaluation of disease activity. Sedimentation rate is reduced, but not significantly. There was a significant reduction in DAS 28 of 1.2 ($p < 0,0001$). This represents moderate therapeutic effect and definitely not an insignificant effect of FT.

Conclusion: If DAS 28 is measure of RA activity, and physical therapy can reduce the DAS 28, then it means that it can affect the reduction of disease activity.

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PEDOBAROGRAFIJA U PREVENCIJI I TRETMANU SINDROMA PRENAPREZANJA

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Sindromi prenaprezanja su čest klinički problem u CBR centrima, populacija koja je najčešće zastupljena su sportaši i rekreativni sportisti. Najčešći sindrom prenaprezanja stopala su: tendinitis, enthensitis prednjeg tibialnog mišića, plantarni fascitis, sindrom prenaprezanja Ahilove tetive, prelomi zamora metatarzalnih kostiju, tendinitis drugog fleksora palca.

Najznačajniji etiološki faktori su poremećaj biomehanike stopala u smislu njegove statičke i dinamičke funkcije. Pedobarografija kao nova dijagnostička metoda pomaže kompjuterskoj dijagnostici stopala hodom po platformi gdje se mjeri plantarni pritisak pomoću tri senzora po kvadratnom centrimetru ploče. Na osnovu dijagnostike u smislu pedobarografije se u kombinaciji sistema CAD (Computer Assisted Design) konstruiše uložak koji se pomoću robot mašine i CAM programa (Computer Assisted Machine) izrađuje na savremen način. Ortopedski ulošci urađeni na ovaj način mogu prevenirati i liječiti mnogobrojne sindrome prenaprezanja u području stopala i cijelog donjeg ekstremiteta. Tvrdoca i vrsta materijalna ortopedskih uložaka biraju se na osnovu kliničke slike, nalaza pedobarografije i zahtjeva za rasterećenje pojedinih dijelova stopala. Ortopedski ulošci za sport se izrađuju od mekših i elastičnih materijala, a vrsta materijala bira se individualno zavisno od tjelesne mase sportiste, tegoba i vrsta sporta.

Stopalo je izloženo velikim statičkim i dinamičkim silama opterećenja koje dovedu do nesklada snage muskulature i opterećenja, te se javljaju sindromi prenaprezanja.

Nova tehnologija, izrada ortopedskih uložaka i pedobarografija omogućavaju sprečavanje i smanjenje tegoba, a u okviru sporta su jedan od važnih karika za postizanje boljih rezultata.

Ključne riječi: sindrom prenaprezanja, sportska rehabilitacija, pedobarografija

A MULTIDISCIPLINARY APPROACH IN GLUCOCORTICOID - INDUCED OSTEOPOROSISBošković K¹, Kovačev - Zavišić B², Grajić M³, Tomašević - Todorović S¹.¹Clinical Center of Vojvodina, Clinic for Medical Rehabilitation, Novi Sad, ²Clinical Center of Vojvodina, Clinic for Endocrinology, Diabetes and Metabolism, Novi Sad, ³Clinical Center of Serbia, Clinic for Physical Medicine and Rehabilitation, Belgrade, Serbia

Glucocorticoids accelerate resorption and inhibiting bone formation, decrease intestinal calcium absorption, increase renal calcium excretion, induce secondary osteoporosis and increases the risk of fracture. Vertebral fractures may occur in as many as 30 – 50% of patients receiving chronic glucocorticoid therapy. A higher fracture risk category should be considered: 1.high daily dose of glucocorticoid, 2.high cumulative glucocorticoid dose, 3.declining bone mineral density on serial dual-energy x-ray absorptiometry (DXA). Physical activity in the treatment of osteoporosis requires a multidisciplinary approach, including medicament and physical therapy. Recommendations for counseling now include fall risk assessment, height measurement, 25-hydroxyvitamin D measurement, and evaluation of patients for prevalent and incident fractures using vertebral fracture assessment by DXA or radiographic imaging of the spine. Recommended drugs include teriparatide and zoledronic acid, while estrogen and testosterone are no longer recommended as therapies for glucocorticoid-induced osteoporosis. Bisphosphonates are not included because of concern for the potential long-term side effects of these medications.

Key words: osteoporosis, glucocorticoids, prevention, therapy

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WHICH EVIDENCE IS NEEDED FOR THE RESEARCH IN REHABILITATION

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In medicine, evidence, composed of information from research considered to be methodologically valid as well as randomized trials (RCTs) used to evaluate the effectiveness of a new drug, represents the factor used to make any clinical decisions for each new patient. In rehabilitative medicine, due to the specific “practical” nature of the theoretical assumptions coming from different hard sciences, evidence can only be considered within a continuous and firm connection with the evolution of knowledge supplied by different scientific disciplines, not just medicine (neurophysiology, philosophy, psychology, neuroimaging, etc.), which allows us to abandon practical views should they prove to have no theoretical foundation. Consider, for example, the “emergentist” studies during the last century, conducted by scientists and philosophers of science, which undermine the myth of objectivity and of gradual development of knowledge, according to a constructivist epistemology where the observer and his theories are within his own descriptions, or the decline of behaviourism and the growth of cognitive psychology with the consequent need to approach in a new way ideas such as consciousness, motor imagery, the physical self and intention, which must enter the world of rehabilitation in a stable way. In this sense exercise, as an “experience” designed with specific therapeutic purposes, if consistently deriving from the theoretical principles referenced and if its effects can be measured, can represent, in relation to success or failure, confirmation or testing of the theoretical model, thereby acquiring a strong epistemological value for research and verification of theoretical assumptions. Rehabilitation, the meeting ground of theoretical assumptions and complex methodologies can therefore take pride in presenting itself today as a propelling element of a process of redefinition of medical and biological knowledge and perhaps more generally, of the “scientific ideal” itself.

NARRATIVE BASED REHABILITATION MEDICINE: A NOVEL APPROACH FOR THE REHABILITATION PROGRAMS

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The Evidence Based Medicine has been a step forward to improve the quality and the appropriateness of the medical practice. A limitation of this approach is that it consider the effect on whole population without consider the single person. Rehabilitation Medicine is an approach devoted to the whole person not to a single apparatus and it is difficult to obtain evidence of the efficacy of the interventions. Since the rehabilitation program is aimed to personalise specific goals related to the need of the person a novel approach is necessary¹. The narrative medicine is a novel approach focus in recording the perspective of the patient relate to his disease with the attempt to understand his need and personalise the clinical approach². In Rehabilitation this method is very peculiar as allow, starting from the narration of the patient, the personalization of the goal of the patients himself and define specific goals in the rehabilitation program. Starting from the narrative approach is possible to identify the most critical areas of rehabilitation, using the narration through ICF (International Classification of Functioning, Disability and Health), to create a targeted rehabilitation programs³.

In the attempt to practically apply this new approach we recruited patients resident in Umbria, Italy, living in their own home with a diagnosis of Amyotrophic Lateral Sclerosis (ALS) who were monitored from March to September 2011. The following factors were considered: age, gender, type of illness and time to diagnosis. For each patient we spent about 1 hour and half collecting the narration of illness using ICF items. The areas evaluated were: communication, travel, personal care and interaction with people, daily activities and social life. To assess the functioning of patients we used 19 ICF items taken from the questionnaire WHO DAS 2 2000, assigning a score from 0 to 4 for capacity and performance, when these were completed a statistical analysis of the collected data was carried out.

Results: We recruited 20 patients with ALS (12 males and 8 females), with a median age of 65 years (range 42-80 years) with different ALS forms at various stages of the disease. The follow up time was 1291.75 days (range 60-5170). The disability areas were: "Remunerative employment" and "doing housework" (mean score 3.85), "dressing" and "washing" (average score 3.6). The items performance using facilitators were: "wash"(100%), "dress"(100%), "sit down"(80%), "move around the house"(70%), "eating"(60%), "move to different locations"(60%), while performance was essentially unchanged in the items: "paid employment" (5%), "economic life" (5%), "managing tension" (10%), "life in the community" (25%), "doing housework" (25%).

Discussion: Different types of narrative were identified. Narrative interviews allow an understanding of living with ALS and highlight the most critical problems that need solving in order to live life as well as possible through keeping active and engaged in life. The facilitators make a difference in the areas of movement and personal care while performance is lower in daily activities and social life. Narrative Medicine and ICF can highlight the critical issues, which will need more attention with a targeted rehabilitation project.

The EBM and Narrative approach are not alternatives but integrative as the reflect the to see Three circles of EBM. Clinical evidence explore the known and unknown. Clinical circumstances integrate the universal and particular. Patients' values speak to both body and self².

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THE REHABILITATION KNOWLEDGE OF PHYSICIANS AND MEDICAL STUDENTS IN HUNGARY

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Background: Physical and Rehabilitation Medicine is recognized as a specialty in its own right, and has a fifty-year long history in Hungary. There are some 30 000 physicians working in the Hungarian health-care system, and more than 300 of them are specialized in PRM. Fifteen trainees pro year are getting ready for practicing PRM specialty. In Hungary, there is a capacity of ca. 6000 inpatient beds available for the rehabilitation of patients with neuro-musculo-skeletal disabilities (Hungary has 10.000.000 inhabitants, 60 000 hospital beds, national health services and mandatory health insurance). Two of the four Medical Universities in Hungary have rehabilitation departments, and there is a gradual education program at all four universities.

The rehabilitation knowledge of physicians - in our experience - is at medium-level. The aim of our investigation was to assess the rehabilitation knowledge of physicians in a general hospital, of rehabilitation trainees during education, and of final year medical students.

Methods: In 2012, we devised a paper-and-pencil survey: a questionnaire with seven multiple choice questions, and three definitions. Questionnaires were filled in independently, and immediately right on the spot. The three answering groups were: physicians (specialized in orthopedic surgery, neurology or neurosurgery) in a general hospital with rehabilitation ward, final year medical students from Semmelweis Medical University, and trainees in rehabilitation medicine. Filling out the questionnaire was voluntary and anonymous.

Results: Forty physicians, 42 students and 39 rehabilitation trainees filled in the questionnaire. Half of the students gave correct answers to questions about rehabilitation specialization, about existing university chairs, about the number of people with disabilities in Hungary, and about the responsibility for referring patients to rehabilitation consultation. The numbers of beds for rehabilitation purposes was unknown, but the legal rights of and regulations relating to people with disabilities was well-known by all groups. Almost nobody was able, however, to define the basic categories (rehabilitation, disability). Rehabilitation knowledge of physicians was not better than that of students, whereas rehabilitation trainees were more informed.

Conclusions: According to our research, students and physicians do not have enough knowledge of rehabilitation to adequately perform medical interventions in Hungary. The extension of the medical curriculum to encompass basic rehabilitation knowledge is suggested. A training course in rehabilitation seems necessary for physicians to be better equipped to carry out their daily hospital work.

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CARDIAC REHABILITATION AFTER MYOCARDIAL INFARCTION IN ELDERLY

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CR is a cost-effective intervention following an acute coronary event, since it improves prognosis by reducing recurrent hospitalization and health care expenditures, while prolonging life. The term cardiac rehabilitation (CR) refers to coordinated, multifaceted interventions designed to optimize a cardiac patient's physical, psychological, and social functioning, in addition to stabilizing, slowing, or even reversing the progression of the underlying atherosclerotic processes, thereby reducing morbidity and mortality. CR programs are recommended (Class I) by the European Society of Cardiology (ESC), American Heart Association (AHA), and American College of Cardiology (ACC) in the treatment of patients with acute coronary syndrome (ACS).

Although, in the early years people over 65 years of age were excluded from rehabilitation programs, now they are in a growing percentage in the rehabilitation centers. Because of significant anatomical severity of coronary artery disease, increased risk of complications and a significant presence of co-morbidities in the elderly, length of hospital stay is almost twice as long compared to younger patients, and it includes extended hospitalization and limitations in physical activity. Even in the period preceding an acute coronary event, the intensity of physical activity is reduced due to the state musculoskeletal system, associated diseases, reduced muscle mass and muscle strength, anxiety, depression, loss of motivation.

Benefits of exercise training are in increasing the working capacity, decreasing in dependence, thus leading to improved quality of life. Improvement of neuromuscular coordination, flexibility, joint mobility, stability, strength and muscle tone, reduces the risk of injuries and falls. It also reduces the occurrence of bone demineralization and consequential osteoporotic fracture, which is particularly important for women. Along with weight control, mental relaxation, self-confidence and reducing anxiety and depression, this training reduces or modifies coronary risk.

Aerobic activity should begin with the low level load of 3 to 4 METS, the increase in intensity and duration should be gradual. Plan of physical exercise should be made after the evaluation exercise test if angina or ischemic changes, silent ischemia, or dyspnea, which is the equivalent of angina in the elderly population, did not occur at the test. Initial load is performed to achieve 40% to 60% heart rate that was achieved on the test load, with a progressive increase in the range of 60 to 75%.

Modern cardiac rehabilitation should be comprehensive, initiated as early as possible, continuous, staged, individualized depending on the clinical state and acceptable for the patient.

VIBRATION ENERGY IN REHABILITATION MEDICINE

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In Medicine Vibration energy can be used both diagnostically and therapeutically.

In Diagnosis Vibration Energy and sEMG can help to test functional instability of the knee after a trauma, or to evaluate hamstring muscle lesions in athletes.

In Reeducational Motor Program Therapeutic Exercise can be executed in normogravity, microgravity, and hypergravity-like conditions.

Therapeutic exercise in normogravity condition (TENG) is made by the patient using free motion or resistance motion in normal gravity field (1g). It means moving the body by the normal air, usually in gyms. *Therapeutic exercise in Microgravity condition (TEMG)* is executed by the patient using free motion or resistance motion in lesser gravity field (acceleration < 1g); it means moving in water or in special tools with partial body weight support. *Therapeutic exercise in hypergravity-like condition (TEHG)* is made by the patient using free motion or resistance motion in higher gravity field (acceleration > 1g); it means moving during supplementation of vibration energy (TEVE).

TEHG is a recent modality of exercise. We can realize it by TEVE. It consists in isotonic and isometric contractions of muscles, enhanced by vibration energy. TEVE is gradually becoming important: this is the product of sinusoidal vibration that elicits tonic vibration reflex, enhancing muscle contraction. TEVE can be used for ameliorating the flexibility; this target exercise can gain range of motion, solve postural problems, and cure focal muscle strains. Vibration exercise can increase proprioception drivers to fast regain drill and coordination after traumatic lesions.

The possible clinical applications are the followings:

Osteopenia, postmenopausal osteoporosis and non union fractures; muscular hypotrophy and hyposthenia, after PNS or osteo-mio-articular lesions or after ortho-surgical treatments; muscle retractions and shortenings, in ROM limitations, postural defects, and muscle lesions; proprioceptive deficits, in balance disorders, or after orthopaedic surgery, and in RSDS.

Actually vibration application on patient needs a severe control by Physician, and a precise and warning application by PTs. Nowadays many experimental studies in this field are going to be published, but the actual knowledge let to see an interesting future for TEVE in Rehabilitation Medicine.

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**EFFICACY OF EXTRACORPOREAL FOCUSED SHOCK WAVES THERAPY IN PATIENTS
WITH CHRONIC PLANTAR FASCIITIS**

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Introduction: Plantar fasciitis is the most common cause of heel pain, it has been estimated that up to 10% of the population will get it in their lifetime. Extracorporeal focused shock wave therapy (ESWT) is increasingly used for plantar fasciitis, but limited evidences support its use.

This study is aimed to evaluate whether ESWT reduces pain and improves function in patients with plantar fasciitis.

Materials and methods: We recruited all consecutive patients suffering from chronic pain due to plantar fasciitis (at least 6 months) who were previously treated with drug therapy without achieving significant results in terms of improvement in pain symptoms. They were evaluated using the “Brief Pain Inventory” (BPI) and Visual Analogic Scale (VAS) before (T0) and after 4 sessions of ESWT (T1). The energy was applied in four sessions – once a week- over a range between 0.13 and 0.33 mJ / mm², without application of local anesthetics.

Results: At the end of the study we collected data about 60 patients (33 M and 27 F, mean age 58.1, mean BMI 26.15). The mean BPI pain severity index was 7.16 at T0 and 1.33 at T1 (p<.000), the mean BPI pain interference index was 6.43 at T0 and 0.83 at T1 (p<.000); the mean VAS score was 7.23 at T0 and 2.14 at T1 (p<.000).

Conclusions: In our study we found a clinical and statistical significant reduction of pain and a clinical and statistical significant improvement in the quality of life, measured with the BPI. Therefore we can conclude that Focused Shock Wave Therapy is a safe and effective treatment for plantar fasciitis.

EXTRACORPOREAL SHOCK WAVE THERAPY IN THE TREATMENT OF CHRONIC TENDINOPATHIES AND OSTEOARTHRITIS

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Introduction: Originally used for the desintegration of kidney stones shock wave therapy became a treatment of choice in patients with chronic orthopaedic disorders in the last years. Its application in musculoskeletal disorders began in the middle of the nineties in Germany and nowadays it has become significant subject of research worldwide.

Material and methods: The author presents the physical characteristics of focused, radial and planar shock wave therapy (SWT) and the differences between them. The physical, chemical and biological mechanisms of the beneficial effects of SWT, found in experimental and clinical studies are presented.

The evidence about the effect of SWT in chronic tendinopathies, resistant to other treatment modalities is discussed. There is good level of evidence about the effect of shock wave therapy in calcifying tendinopathy of the rotator cuff, tendinopathy of the Achilles tendon and patellar tendinopathy and moderate evidence with conflicting results about its efficiency in lateral epicondylitis of the elbow and plantar fasciitis. The treatment protocols are not unified and no precise algorithm has been accepted. The author shares own experience in achieving pain relief and functional improvement after the application of radial shock wave therapy in patients with tennis elbow and plantar fasciitis. The effect of radial shock wave therapy in the treatment of patients with osteoarthritis of the knee was studied. A hundred and seven cases with knee osteoarthritis were included in the study. They were divided into 3 groups: 1st group – treated with radial shock wave therapy, 2nd – with placebo application and 3rd – with complex physiotherapy treatment (interferential currents, low frequency pulsed magnetic field and kinesiotherapy). Clinical methods were used for the assessment of the results: ROM, manual muscle testing, VAS (10 cm) for pain at rest, during walking, ascending and descending stairs, at palpation; Knee injuries and osteoarthritis outcome score (KOOS). The assessment was made before the treatment, right after it, one month and three months later. Statistical methods: analysis of variance, Student Fisher t-test, oneway ANOVA.

Results: A statistically significant improvement in the functional scores and pain relieving effect was found in the study group after the application of RSWT, which was not observed in the placebo group. Statistically significant better results were found in the group treated with radial shock wave therapy in comparison with the group with conventional physiotherapy, regarding pain ascending and descending stairs (VAS) and KOOS.

Conclusion: The evidence about the beneficial effect of shock wave therapy in chronic tendinopathies in comparison with the vast majority of other conservative and operative methods is above average, so it could be recommended in case the proper indications are followed. The application of radial shock wave therapy in patients with knee osteoarthritis give promising results, but further studies are needed to clarify the exact mechanisms and the appropriate treatment protocol.

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PAIN ASSESSMENT AND MANAGEMENT IN ELDERLY

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Pain is an unpleasant, subjective, multifaceted, biopsychosocial experience. The prevalence of clinically significant pain in older adults is estimated at 25–50% in the community and at 45–80% in nursing homes. Non malignant pain in elderly is most frequently associated with musculoskeletal disorders, such as degenerative spine conditions and arthritis. The four most frequently reported sites of pain in older patients are the knee, hip, hand, and low back. Clinical manifestations of pain are complex and multifactorial in the older population because of medical comorbidities and physiological and cognitive changes that make pain evaluation and treatment more difficult.

Unfortunately pain in this population is mostly undiagnosed and untreated despite important fact that it is associated with a number of adverse outcomes like functional impairment, falls, mood changes, sleep and appetite disturbance, decreased socialization, and greater healthcare use and costs. Difficulties arise from widespread misunderstandings of pain and its treatment in elderly adults and in addition from underreporting of pain in large variety of personal, cultural, or psychological reasons. Detailed medical history and physical exam of geriatric pain patient especially systematic screening of each body area is a key point in defining an appropriate assessment and treatment strategy. The best indicator of the pain experience is the patient's own report. Self-report measures assessments of pain intensity (uni-dimensional pain scales) can be quickly and easily used. McGill Pain Questionnaire (MPQ) remains the most widely used for specific sensory attributes because of cross cultural reliability validity and solid discriminative capacity in different pain syndromes. The social and cultural factors contributing to pain expression could be assessed by the West Haven-Yale Multidimensional Pain Inventory (WHYMPI). Specific problem is recognizing pain experienced by patients with cognitive impairment. There is no golden standard in the assessment of pain in the elderly with cognitive impairment, but several useful behavioral assessment tools are available. Performance-based functional assessment is necessary to draw pain's impact on function.

Pain management in older adults requires a special emphasis on the needs of this population. Pain is a multifaceted problem and therapy goals are addressed to pain control, improving of function and altering of pain behaviors through an individualized approach. Multimorbidity, polypharmacy and elderly subjects' vulnerability to adverse reactions of medicines constitute a big challenge to the pharmacology treatment of pain. Evidence indicates that physical activity, occupational therapy and education can reduce pain and disability of musculoskeletal origin, without reasonable understanding of pathways from pain to disability.

However many gaps exist between patient subjective experience, report of pain, mechanisms of disability and objective information required to develop appropriate therapeutic options.

IMPORTANCE OF PHYSICAL THERAPY AND REHABILITATION IN GERIATRICS

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Aging is associated with progressive and irreversible tissue changes, with an increase in the prevalence of acute and chronic diseases, which adversely affects the functional state of the entire organism. The most common diseases of the elderly are articulated skeletal, cardiovascular, diabetes and its complications (amputation), psychiatric, neurodegenerative and cancer diseases, and they are often associated. Frequent injuries resulting from falls are bone fractures caused by osteoporosis. Physical therapy is an individualized and comprehensive program of therapy that uses various types of medical rehabilitation, in order to maintain, restore or improve the physical, psychological, medical, social, emotional, professional and economic status of the patients. In the selection of the treatment determining are the type and number as well as the degree of severity of present disease. In the elderly persons are often present two or more of the diseases, which should be taken into account when selecting the type of physical therapy. When deciding which types of physical therapy to apply it should be first assess their positive effects, possible side effects and contraindications. The main methods involve the use of physical therapy, physical training and physical activity, in the form of active and passive exercises and the use of adaptive techniques (modifications in these activities). If necessary, it will be included the assistive technology, ie. use devices such as orthotics (corsets, supports, connections, splints, raise,...) and prostheses (artificial limbs and joints). In physical therapy are also used modalities (eg, use of lasers, heating, cooling, ultrasound, magnetic and pulsed electromagnetic fields, electrical impulses, iontophoresis, hydrotherapy, massage). Applied therapy aims to improve the health and functional status, and psychological, physical and socio-economic status of patients, and in this way to improve the quality of life. It is mandatory for the successful rehabilitation also the inclusion of education and accommodation, to preserve the dignity of life, and where possible to prevent new diseases and complications, including the appearance of functional disability, and geriatric syndromes (immobility, dependence, physical instability and uncontrolled urination).

Keywords: geriatrics, physical therapy, rehabilitation

ICF CONCEPTS IN THE REHABILITATION OF BREAST CANCER PATIENTS WITH POSTMASTECTOMY LYMPHOEDEMA

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Lymphoedema is one of the frequent consequences of breast cancer surgery with axillary dissection. It is associated with psychological and physical problems resulting in impaired functioning and health related quality of life (HRQoL). Therefore, it is important to assess functioning in detail using the International Classification of Functioning, Disability and Health (ICF) and target treatments accordingly to improve HRQoL of breast cancer patients with postmastectomy lymphoedema. Recently developed and validated Lymph-ICF questionnaire assesses functioning properties in five domains including two domains in functions (physical and mental) and three domains in activities and participation (household, mobility, and social activities) (1). There are many physical and rehabilitation medicine (PRM) interventions to address problems in functioning of those with lymphoedema. These include patient education regarding skin care, avoidance of infections, weight reduction and exercise as well as compression garments, compression bandaging, pneumatic compression, and manual lymph drainage. The combination of those known as complex decongestive therapy is the recommended treatment for breast cancer related lymphoedema (2). Regarding evidence of the effectiveness of PRM interventions in the management of lymphoedema in breast cancer survivors, a systematic review revealed moderate evidence that weight reduction was associated with a significant decrease in lymphoedema volume. Strong evidence was found for the beneficial effects of exercise in decreasing pain and tenderness caused by lymphoedema and improving HRQoL, while not decreasing or exacerbating upper extremity volume. Compression garments were also shown to be beneficial, while intermittent pneumatic compression therapy was not found superior to no treatments or others like manual lymph drainage added to compression garments (3). Complex decongestive therapy was associated with significant improvements in physical and psychological function and HRQoL, however, not based on level I evidence (4). There is also a place for low level laser therapy which has been shown to be associated with limb volume reductions (5). Traditional acupuncture might cause a decrease in the sense of heaviness and tightening in the oedematous upper extremity (6). Dance/movement therapy was suggested to have favourable effects on HRQoL, although not on body image, shoulder range of motion, or arm circumference (7). In conclusion, although there are a number of evidence-based PRM interventions to target treatment for impaired functioning in breast cancer survivors with postmastectomy lymphoedema, it seems that there is a need for more rigorous trials to show benefits particularly in activities and participation components of the ICF.

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**PAIN AND PHYSICAL ANALGESIA:
THE POTENTIAL OF PHYSICAL MODALITIES TO REDUCE PAIN**

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Current work presents a personal opinion on some contemporaneous theories on pain and our own therapeutic concepts on physical analgesia or the potential of physical modalities to reduce the pain of adult patients.

In physical medicine, we applied the principles of gate-control theory of Melzack & Wall for central nociceptive influence. Investigations of prof Y Gacheva have demonstrated that selective electrostimulation of tactile A β -nerve fibers (with high velocity of conduction) provokes a preliminary stimulation of suppressive neurons, that inhibit tardily occurring nociceptive stimuli of A δ and C-fibers (with lower conduction velocity). It is assumed that a closer suppressive transfer mechanism exists at spinal level. At the peripheral level, direct anti-adaptation electrostimulation of the receptors probably provokes a hyperpolarization with an increase of the sensibility of nociceptors. A direct low frequency electrical stimulation of the A δ and C fibers may have an analgesic effect.

We propose our own theory to explain the mechanisms of action of physical modalities on nociceptive and neuropathic pain [we introduce the notion **physical analgesia** or anti-pain effect of physical modalities]. The physical complexes used may provoke an analgesic effect by the following mechanisms: By influencing the cause for irritation of pain receptors – a consequence of stimulation of circulation, metabolism and trophic of tissues (by low and medium frequency electric currents, magnetic field, ultrasound, He-Ne laser; massages; manual techniques); By blocking nociception (low frequency currents, including transcutaneous electrical nerve stimulation or TENS; lasertherapy); By peripheral sympatolysis (low frequency currents like dyadinamic currents, peloids); By stopping the neural transmission (via C and A δ delta fibers) to the body of the first neuron of general sensibility (iontophoresis with Novocain in the receptive zone – the region of neuro-terminals); By input of the gate-control mechanism (TENS with frequency 90-130 Hz and interferential currents with a relatively high resulting frequency - 90-150 Hz); By activation of the reflectory connections: cutaneous – visceral, subcutaneous-connective tissue-visceral, proprio-visceral, periosteal-visceral and motor-visceral (classic manual, connective tissue and periosteal massage, post-isometric relaxation and stretching-techniques); By influence on the pain-translation in the level of posterior horn of the spinal medulla – using the root of activation of encephalic blocking system in the central nervous system (increasing the peripheral afferentation) and influence on the descending systems for pain control (TENS with frequency 2-5 Hz and interferential currents with low resulting frequency 1-5 Hz, acupuncture and laserpuncture; reflectory and periosteal massage, zonotherapy, acupressure, sudogok massage; preformed factors in reflectory zones /palms of hands, plants of feet, paravertebral points; zones of Head, of Mackenzie, of Leube-Dicke, of Vogler-Krauss/); By influence on the psychic state of the patient [the «doctor» drug and the «procedure» drug].

We present some personal experience concerning comparative evaluation of drug, physical and combined analgesia - on peripheral nociceptive and neuropathic pain.

Keywords: physical modalities, rehabilitation, pain, analgesia, nociceptive pain, neuropathic pain

IS BENIGN HYPERMOBILITY SYNDROME...BENIGN?

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Joint hyper mobility syndrome JHMS is a defect in connective tissue matrix proteins, caused by genes defects.

Causing some biochemical consequences leading to biomechanical consequences with easy pathology due to trauma/overuse.

Joint hyper mobility syndrome has wide range of clinical features, more than we expected. There is high possibility of association with many neurophysiologic defects. This are manifested by the presence of proprioceptive impairment, enhanced pain perception and autonomic dysfunction

Genetic link to anxiety and phobias was evident in hypermobility syndrome with high frequency of Panic disorder, agrophobia, social phobias which are 4 folds more common in hypermobile patients than control

Mitral valve prolapse is common in hypermobility syndrome with high risk of infective endocarditis.

Genital prolapse is also common in JHMS, where 75% of genital prolapse women had JHMS Vs., 14% of normal control

Symptoms and signs in infancy are mainly congenital dislocation of the hip and motor delay-late walkers. While in childhood, manifested by Juvenile episodic arthralgia, Growing pains, fibromyalgia, recurrent dislocation/subluxation, adolescent growth spurt and flat foot. This syndrome is proved not to be benign and needs much update in its rehabilitation programs as it is multisystem disease.

THERAPEUTIC MODALITIES FOR PATIENTS WITH CEREBRAL PALSY

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Cerebral palsy (CP) describes a group of disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. *The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, cognition, communication, perception, and/or behavior, and/or by seizure disorder.* According to dominant neurological signs CP could be: spastic (bilateral and unilateral), discinetic (dystonic and choreo-athetotic) and ataxic CP. In the treatment of children with CP we could use: kinesiotherapy, occupational therapy, medicamentous therapy (e.g. botulinum toxin type A), orthoses, electrotherapy (e.g. functional electrical therapy), surgical intervention etc.

Botulinum toxin type A is relatively recent addition to the available medical interventions for children with CP. Our research showed (41 patients) that spasticity of adductors of the hips and plantar flexors were significantly decreased two weeks, one and half months and three months after the treatment. Approximately 85% of patients achieved the expecting therapeutic goals according to Goal Attainment Scale. In combination with post-injection physiotherapy this treatment could provide long-term benefits. Functional Electrical Therapy is the clinical application of a small electric current to the intact nerves in order to trigger a muscle contraction. This contraction is then incorporated into a functional activity, for example walking, reaching etc. Our preliminary study (13 patients) showed improvement in performances of the paretic hand, better control and quality of movements. This method can serve as an additional treatment for habilitation of children with hemiparetic cerebral palsy. Therapeutic horse riding (THR) is one of the possible ways of habilitation in children with CP. As the horse walks, its center of gravity is displaced three-dimensionally with a movement very similar to the action of the human pelvis during gait. The warmth of the horse coupled with this rhythmical movement is *thought* to be useful in reducing abnormally high muscle tone and promoting relaxation in the rider with spastic CP. In our research (12 patients), passive range of motion (lower extremities) and muscle strength (muscles of the trunk) were significantly higher after 10 weeks of riding. Spasticity was significantly lower after the THR. During the time use of various technical and technological innovations increased e.g. robotics in (re)habilitation. The main aim is to improve the mobility of the upper and lower extremities, learning or reeducation of walking, and improving social skills of patients. Application of robotics could increase motivation of patients, and as a result is more effective (re) habilitation treatment.

The important principles in the treatment of patients with cerebral palsy is good evaluation of patients and tailored treatment for each patient.

Key words: Cerebral Palsy, children, therapy

TREATMENT OF SPASTICITY IN CEREBRAL PALSY

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Cerebral palsy (CP) is the most common physical disability in childhood. CP refers to a group of non-progressive movement and posture disorders resulting from injuries to the developing fetal or infant brain. Children have problems with motor functions as a result of limbs spasticity, which leads to severe contractures and limbs deformity. The most common characteristic of cerebral palsy is movement abnormalities: spasticity, chorea, athetosis, ataxia, dystonia, as well as their different combinations. About 70-80% of cerebral palsied children suffer from some spastic form. Spasticity is a type of muscle hypertonicity characterised by quick increase of resistance to passive stretching of muscles.

Management of spasticity in CP involves multidisciplinary intervention intended to increase functionality, sustain health, and improve quality of life for children and their carers. This may include: oral medications, intrathecal medications, physiotherapy, occupational therapy, orthoses, surgical interventions, and pharmacological agents such as botulinum toxins.

Botulinum toxin type A (BoNT-A) is a serotype of botulinum toxin, produced by the Gram-positive bacterium *Clostridium botulinum*. This potent neurotoxin selectively inhibits the release of acetylcholine from peripheral nerve terminals by binding to synaptic vesicles. Interruption of neuromuscular conduction by BoNT-A induces a temporary weakness, which reduces focal spasticity. The effects of BoNT-A last for approximately 3 months as the muscle will recover via proximal axonal sprouting, the formation of new neuromuscular junctions, and the regeneration of the original neuromuscular junctions. The efficacy of BoNT-A in the management of individuals with CP has been widely reported in the literature.

Physiotherapy for spasticity refers to a range of physical treatments. It is the most common form of treatment for spasticity in children. The treatment should be designed to meet child's specific needs and should reduce muscle tone, maintain or improve range of motion and mobility, increase strength and coordination, and improve care and comfort.

Conventional rehabilitation. Stretching forms are the basis of conventional rehabilitation for treating spasticity. Stretching helps to maintain the range of motion in joint and helps prevent contracture. To be effective, the prescribed stretching routine must be done regularly, usually once or twice a day.

Facilitation. This includes neurodevelopmental therapy (also known as Bobath approach) aimed at reducing inappropriate reflexes and training muscles to achieve normal balanced reactions. Proprioceptive neuromuscular facilitation seeks to retrain spastic muscles for normal motion. Sensory integration involves continually repeating tasks, often with the therapist directing the limb while child remains passive, so that child's brain is "retrained" in the proper movements.

Orthoses. Also known as casts, braces, or splints, orthoses include any device that is used to support, align, prevent, or correct deformities, or improve the function of movable parts of the body. When used to treat spasticity, orthoses may reduce muscle tone and increase or maintain motion.

Surgical treatments. Operations involving the nervous system (neurosurgery) and the bones, tendons, and muscles (orthopaedic surgery) are both used to treat spasticity and, in properly selected patients, can play a very important role in the treatment of chronic spasticity.

TREATMENT OF COGNITIVE IMPAIRMENT AFTER A STROKE

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The process in which people act at the highest level include cognitive or mental activities. Cognitive deficits in the neurological disease have significant impact on the patient and beyond. After the diagnosis of cognitive dysfunction such as attention, memory, visuospatial orientation, language dysfunction and executive functions, systematic techniques based on neurorehabilitation are carried out in coordinated teamwork. Solutions of motor, cognitive and neuropsychological disorder are based on three models as a single entity in the process of neurorehabilitation. These are: physical, cognitive and neuropsychological rehabilitation.

In creating the neurorehabilitation of patients with brain damage, physical, cognitive and neuropsychological rehabilitation make unique process based on individual approach, taking into account the specifics of each patient. The ultimate goal is to return activities of daily living and independence to the optimum level of functioning.

THE IMPORTANCE OF ELECTROTHERAPY IN THE OVERALL TREATMENT OF PATIENTS WITH HEMIPLEGIA

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Introduction. Stroke is a major illness in our country with huge disabling consequences. A stroke causes impairment of the cognitive, sensory, perceptive, and motor functions. Due to the unequal distribution of spasticity in the muscle groups in spastic phases Typical Upper Extremity is: Shoulder: internal rotation, Elbow: flexion, Forearm: pronation, Wrist/ Fingers: flexion, Thumb: in palm. Typical Lower Extremity Postures is: Hip & Knee Extended, Ankle Plantarflexed, Foot/ ankle inverted, OR Hip & Knee flexed, Ankle Plantarflexed. Foot drop is a common problem following a stroke. Various pain syndromes are common after stroke and require careful medical assessment and medical assessment and management. The therapy consisted of the following currents: a) Constant (constant) DC constant speed, and the • Galvanic current in the form of a stable and electroplating, Special forms of application of galvanic current Electrophoresis on drugs, b) Impulse DC. Of which are commonly used dijudinamic power, exponential power. AC can be: Low frequency (from 1 to 1000 Hz), The aim of this study was to establish distribution of electrical therapies for the treatment of patients with hemiplegia; the efficacy of a therapeutic intervention based on functional electrical stimulation therapy to improve motor function after severe hemiplegia due to stroke. Evaluate the efficacy of electrical therapy in reducing hemiplegic shoulder pain (HSP).

Materials and methods. A total of 46 subjects with acute and subacute stroke were randomized into 2 groups, ES plus conventional occupational and physiotherapy (ES group) or only conventional therapy (control group) 6 days a week for 4 weeks. Patients in spastic phases with typical Upper Extremity flexion synergism and Lower Extremity extensions synergisam were randomly assigned to either a control group (n = 23; 13 female, and 10 male) or experimental group (n = 23; 14 female, and 9 male). The experimental group received additional ES therapy for shoulder muscles (supraspinatus and posterior deltoid), wrist and finger extensors, quadriceps and to the peroneal muscles and dorsiflexors of the foot in the treatment of dropped foot.

Results. A statistically and clinically significant increase in wrist extension range occurred in the subacute group that had wrist flexion contractures before the electrical stimulation. Increased extension was noted at the metacarpophalangeal and proximal interphalangeal joints, ankle joint of patients in the chronic group. We concluded that the FES program was effective in reducing the severity of shoulder subluxation and pain, and possibly facilitating recovery of arm function.

Conclusions. Different models of electric current are useful in the treatment of patients with hemiparesis for reducing pain and spastic muscle tone, improve trophics, and maintenance of the contractile ability of plegic and paretic muscles.

Key words: Stroke, hemiplegia, electro therapy, Neuromuscular electrical stimulation

BALNEOTHERAPY ASPECTS OF ZEOLITE IN MEDICAL CLINICAL PRACTICE

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Natural zeolites are crystalline aluminosilicates of vulcanic origine. Wide use of natural zeolites is enabled by their adsorptive, cation-exchange and catalytic characteristics. Clinoptilolite is a crystalline zeolite made by special nanotechnology process and used in medical purposes. Clinoptilolite is 100% natural, non-toxic and inert. It acts like an auto-bioregulator in the human and animal organism, that has a significant role in basic life processes. Mostly is used by ingestion or local skin application. It has potent antitoxic, antioxidant, immunomodulating, buffering, antiinflammatory, analgetic, hemostatic, antifungal, antibacterial and antiviral effects, that exhibits in human body. In the clinical practice, clinoptilolite effectively removes heavy metals and mycotoxins from the body, increases the antioxidant status, especially in patients with malignant disease and diabetes mellitus, sets the acid-base status of the blood to the physiological levels, reduces pain in muscles and connective tissue, stops diarrhea and external bleeding, reduces fungal infection, antagonize the effects of hepatitis B and C viruses, reduces drowsiness, speeds recovery and stimulates wound healing. Zeolite addition to the natural peloides improves their quality and makes them more effective in the treatment and rehabilitation of rheumatic diseases, posttraumatic conditions, and neurodegenerative diseases. In Serbia, the European Union, the USA and many other countries around the world, zeolit is registered as a dietary supplement and in some countries (Russia, China) as an useful remedy.

Keywords: zeolite, balneoclimatology, antioxidant, antitoxic, immunomodulators

BALNEOTHERAPY FROM EMPIRICISM TO SCIENCE

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Balneotherapy factors have been used since ancient times for therapeutic purposes, based on empirical experience carried forward from generation to generation. In recent decades, in the world, this branch of medicine is experiencing a major transformation due to scientific evidence of the effects of natural factors. New researches provide new knowledges and explore new therapeutic options, restore confidence in the old therapeutic procedures and eliminate prejudice. Balneoclimatology is becoming the branch of medicine that, in the fields of natural factors, combines not only in clinical practice but also in scientific research a large number of medical branches that normally have little common ground. In addition to dealing with the treatment and rehabilitation, in recent years balneoclimatology covers a significant place in prevention.

Natural factors used in balneology are mineral water, gas, mud and climate factors. The essence of natural factor's effects are local changes caused by the direct influence of mechanical, thermal and chemical factors through the skin and mucous membranes and complex adjustment reactions as a result of neuroreflex, humoral mechanisms, caused by stimulation of mechano, thermo, baro and chemoreceptors by biochemical active substances during the balneoprocedure. Often, the general and local effects can not be clearly distinguished, primarily because of organism's response to each natural factors's stimulus.

On the other hand, knowledge of the mechanism of action of natural factors in certain pathological conditions is of paramount importance for the application of the treatment, as well as for the clear determination of the side effects and conditions that are contraindications for their use. It is also extremely important that every natural resource is classified, based on chemical and physical characteristics, into specific categories, on which prescribing indications, and contraindications for use is based.

Studies of natural healing factors include hydrologic-experimental-clinical testings, and chemical studies divided into pharmacodynamic and pharmacotherapeutic research. The overall effect of the application of balneofactors depends on their physical properties, as well as the way of their implementation.

Total effect of these factors is product of the strength of stimulation, which along with the duration of the procedure and the surface of the body to which the stimulus acts, represents a balneotherapeutic dose (BTD). BTD determines the intensity of the stimulus that a certain balneoprocedure performs on the body. In case of inadequately determined dose, excessive as well as insufficient, instead of beneficial, effect on the body may be unfavorable.

MOST FREQUENT ERRORS AND CONTROVERSIES IN THE INTERPRETATION OF OSTEODENSITOMETRY AND INITIATION OF TREATMENT

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Currently available clinical data and sufficient assessment of bone quality, independent of bone density, does not exist, therefore, the practical guideline for the diagnosis of osteoporosis measuring bone mass is assessment by measuring bone mineral density (BMD).

Dual energy X-ray absorptiometry (DXA) - gold standard techniques, with high specificity and low sensitivity, which varies with the cutoff chosen to designate high risk.

The incidence and prevalence of osteoporosis and the risk of fracture, also differs according to the measurement site, the studied population and diagnostic techniques used. The correlation between the same measurement points and different technologies, and different measurement points and DXA evaluation is very low (<50%).

The gradient of fracture risk associated with BMD decreases with age, because age contributes to risk independently of BMD and other risk factors became more important.

Also, as various non-skeletal factors contribute to fracture risk, so the level of BMD is not just the diagnosis of osteoporosis but also an assessment of risk factor for the clinical outcome of fracture.

A distinction should be made, therefore, between BMD use for diagnosis or assessment of risk.

BMD accounts for only one of the characteristics of bone quantity, which determines the quality of bone strength. Previous data suggested that the proportion of BMD in bone stiffness and risk of fracture was 70-80%, whilst new data suggests only about 30%. Genetic factors dominate with over 60% compared to all other risk factors. At the age of 50, the number of women with osteoporosis, who will vertebral and non vertebral fractures during the next 10 years, is approximately 45%. Latest data confirmed that the overall detection rate for fractures (sensitivity) is low, and 96% of fractures at the spine, hip, forearm or proximal humerus will occur in women without osteoporosis. Low sensitivity is one of the reasons why widespread population-based screening with BMD is not widely recommended in menopausal women.

The viewpoint that measurement of bone mineral density from two or more tests, rather than at several measuring points, increases the ability to predict fracture risk, is under discussion. Seems that the same result can be achieved by defining osteoporosis, as a T- score of ≤ -2.0 SD rather than ≤ -2.5 SD.

Therefore, the diagnostic criteria for osteoporosis by DXA are not the criteria for initiation of therapy. Before making the decision to start treatment, risk factor analysis, proper DXA interpretation including technical limitations, and X-ray assessment of thoracic and lumbar vertebral segments should be performed, and secondary causes of osteoporosis excluded.

Basic BMD level is a stronger predictor for vertebral fracture risk than changes in BMD during treatment. It is not proven that an increase in BMD determines the effectiveness of treatment. In general, it is considered that the T- score reflects actual risk of fracture, and the Z- score reflects the lifetime risk. If the Z-score < -2.0 SD - then the cause of secondary osteoporosis needs to be investigated. The Z -score is important in interpreting BMD in older patients because 70% of women aged over 80 have a T-score of < -2.5 SD.

FRAX index – computer based, strikingly differs in different parts of the world.

It is used in over 45 countries where there is epidemiological data on fractures and survival as supported by primary health care. Therapeutic measures and cut off undertaken in relation to economic budget, participation and the importance of osteoporosis in any particular country.

Decision on the implementation of therapy should be based on the prior probability of the occurrence of fractures rather than on the basis of the T- score value.

Key words: Bone mineral density, initiation of treatment of osteoporosis, fracture risk

THE EFFECT OF LOAD AND EXERCISE ON BONE MASS AND STRUCTURAL GEOMETRY

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Mechanical strains, due to weight bearing or muscular loading forces, play a pivotal role in the triggering of the bone remodeling process all along the adult life. By means of remodeling, bones are able to adapt continuously to mechanical loads by adding bone tissue to improve resistance or by bone resorbing in response to a decreased use. The mechanical parameters locally influencing balance between formation and bone resorption are frequency, intensity, and duration of the mechanical stimulus. Bone strength and quality are improved if the mechanical stimulus is applied by short increments rather than over long periods. Osteocytes are able to respond to mechanical stimulation by modulating the expression and the secretion of many molecules. In particular, osteocytes are able to respond to mechanical stress via the Wnt/Lrp pathway, that is a negative regulator of sclerostin secretion, whereas the sclerostin itself is a negative regulator of the bone formation. Osteocytes can propagate their message to other connected cells by diffusion of produced molecules (paracrine effects), and by local transmission through gap junctions. Physical activity has a positive impact on bone quality. On the other hand, the reduction of mechanical loading, such as in a murine model mimicking weightlessness, increase osteocyte apoptosis, osteoclast recruitment and bone resorption. The global role of the osteocyte in mechano-sensing is generally accepted but the molecular pathways involved in the mechano - sensing phenomenon remains debate.

REHABILITATIVE INTERVENTIONS FOR PREVENTION OF FALLS IN PATIENTS WITH OSTEOPOROSIS

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Introduction: Osteoporosis is the most common metabolic bone disease and can result in devastating physical, psychosocial, and economic consequences. Fragility fractures, which occur secondary to low-energy trauma are characteristic of osteoporosis. Many individuals experience morbidity associated with the pain, disability, and diminished quality of life caused by osteoporosis-related fractures.

Aim: The aim of the article is to present the current knowledge from clinical trials about using the rehabilitative interventions for prevention of falls in patients with osteoporosis.

The first step in the management of osteoporosis is the assessment of the patient's risk of osteoporosis related fractures, which may be well managed by BMD measurement with DXA, using WHO Fracture Risk Assessment Tool (FRAX®), assessment of balance etc. There are many medical and environmental risk factors for falling. Medical risk factors includes weak muscles, impaired mobility and transfer, poor balance, reduced proprioception, diminished cognitive skills, neurologic factors, kyphosis, vestibular dysfunction, vertigo, eyesight disturbances, orthostatic hypotension, urgent urinary incontinence, receiving some medications etc . Extrinsic and environmental risk factors are slippery outdoor conditions, obstacles in the walking path, low level lighting, lack of assist devices in bathrooms, inappropriate shoes, inappropriate orthopedic devices etc.

There are many PRM interventions for modifying these risk factors like weight –bearing and muscle strengthening exercises, balance training, proprioception exercises, posture training, activity of daily living and mobility training, Tai Chi exercises, appropriate orthopedic devices (corsets, braces, orthopedic shoes, walking aids), assist devices in bathrooms and halls, urogynecological rehabilitation etc. Patient education is paramount in the treatment of osteoporosis.

Conclusion: Regarding evidence rehabilitative interventions have a significant role in modifying risk factors for falls in patients with osteoporosis. That is very important in prevention of fall-related fractures incidence and their impact on quality of life in this population.

Key words: osteoporosis, rehabilitation, prevention, falling

COMPLEX REGIONAL PAIN SYNDROME TYPE 1 - THE IMPORTANCE OF EARLY DIAGNOSIS AND APPROPRIATE TREATMENT

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Complex regional pain syndrome (CRPS) is a chronic condition with clinical features that include pain, sensory, sudomotor and vasomotor disturbances, trophic changes, and impaired motor function. The difference between CRPS I and II is based on the presence or absence of nerve damage: CRPS I (also known as reflex sympathetic dystrophy) is not associated with nerve damage, whereas CRPS II is associated with objective evidence of nerve damage. However, there are growing evidence of minor nerve lesions in CRPS I, also.

A chronic CRPS causes multiple problems for both patients and practitioners, due to the large variety of available treatment options, but currently has no cure. Also, there is a small number of high-quality research on this subject and no strong consensus regarding the optimal management of CRPS. For a wide range of commonly used interventions, there is either no evidence or very low quality evidence available from which no conclusions should be drawn.

Early diagnosis and appropriate treatment (or avoidance of mistreatment) is certainly crucial to avoid chronicity and to limit the disability from the disease. Early treatment, ideally within three months of the first symptoms, often results in remission. If treatment is delayed, however, the disorder can quickly spread to the entire limb and changes in bone, nerve and muscle may become irreversible. For early diagnosis, monitoring of acute injury from the very beginning to the estimated duration of the treatment is crucial. It is important to alert clinicians not to overlook CRPS, especially if they suspect that patient may not follow the expected course of recovery within the expected length of time.

Treatment plan: Following a CRPS diagnosis, treatment should be focused primarily on pain control and functional restoration. Physical and occupational therapy are the cornerstone and first-line treatment for CRPS. It is important to start early with gentle exercises, desensitization techniques and education of patients to take active role in their rehabilitation and to encourage them to use the limb.

In the early onset, under the assumption that neurogenic inflammation is the pathological mechanism, NSAIDs and steroids should be administered. NSAIDs are used first and their dose should be increased until the pain is well controlled. NSAID may counteract the ongoing inflammation; early use may be an important step in preventing sensitization. Glucocorticoids targeting mast cell activity, correct the baseline inflammatory status to lower disease activity and, thus, lower production of pro-inflammatory cytokines and also prevent central sensitization. If the pain is not reduced then other types of medicine are used: tricyclic antidepressants, gabapentin or bisphosphonates. Physical therapy modalities that are empirically proved to reduce pain and edema or modulate inflammatory process should be used as soon as CRPS is diagnosed. Psychological or psychiatric therapy (cognitive behavioral therapy and relaxation techniques) and initial sympathetic block trial may be considered in cases that do not demonstrate functional gains during initial treatment. Some patients will develop long-standing CRPS. Then, the treatment must change its target, from functional restoration to relieving the symptoms and helping people with this syndrome to live as normal life as possible. They required multidisciplinary approach.

In conclusion: CRPS is quite often misdiagnosed, diagnosed too late, or it is believed that it is "all in their head". As a result, many patients do not receive the proper treatment on time and they suffer needlessly. Given the importance of early diagnosis and treatment of CRPS, it is important to raise awareness and knowledge of medical staff about CRPS.

FIBROMYALGIA: BEST EVIDENCES IN PHYSICAL AND REHABILITATION MEDICINE

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Introduction: Fibromyalgia (FM) is a syndrome of persistent widespread pain, stiffness, fatigue, disrupted and unrefreshing sleep, and cognitive difficulties, often accompanied by multiple other unexplained symptoms, anxiety and/or depression, and functional impairment of activities of daily living (ADLs), is a now recognized as one of many central pain-syndrome that are common in the general population. It typically presents in young or middle-aged women with a prevalence varying between 0.66 and 10.5% in studies. A new ACR Criteria Proposed for diagnosing Fibromyalgia. Tender points have been replaced. The diagnosis is based on evaluating WPI (Widespread Pain Index) score and SS (Simpton Severity) score. Some investigators believe that a successful FM rehabilitation program involves a multidisciplinary team of professionals and various modalities individualized for each

Aims: The objective of this study is to demonstrate best effectiveness of the rehabilitation program in FM.

Method: we have used different sources of search: Scientific Pub Med-MEDLINE, Pedro, Cochrane Library, the Ottawa Panel, EULAR and magazines.

Results: A combination of pregabalin or serotonin noradrenaline reuptake inhibitors as pharmacological interventions and multicomponent therapy, aerobic exercise and cognitive behavioural therapy as non pharmacological interventions seems most promising for the management of FM, which is tailored to each individual patient. Physical fitness benefits from the treatment can be maintained over the long term. Therefore, there is an important role for PRM specialists to prescribe exercise for their patients with FMS at a suitable intensity tailored to the condition of the individual patient that will not exacerbate FMS symptoms

Key Words: rehabilitation, scientific evidence, fibromyalgia

CURRENT CONCEPTS FOR IMPROVING REHABILITATION OUTCOME IN ATHLETES AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Introduction: Anterior cruciate ligament (ACL) injury is one of the most serious injuries related to sports performance. This type of knee injury is especially common in athletes participating in so called pivoting sports that are characterised to put high demands on knee joint stability. Unrestricted participation in sports and return to the pre-injury level is often considered an indicator of the success of ACL reconstruction. Following a bone-patellar tendon-bone autograft (BPTB) or four-stranded semitendinosus/gracilis tendons autograft (ST/G) anterior cruciate ligament (ACL) reconstruction, the speed and safety with which an athlete returns to sports (or regains the pre-injury level of function) depends on the rehabilitation protocol. Considering the large differences in clinical and outpatient protocols, there is no consensus regarding the content of such a rehabilitation program. Another problem that exists is a lack of information and consensus regarding the appropriate criteria for releasing patients to unrestricted sports activities postoperatively.

Materials and methods: A literature search was conducted using the Medline database. A systematic search was performed to identify the factors investigators used to determine when return to athletics was allowed after primary ACL reconstruction. Inclusion criteria were English language, publication within the last 10 years, clinical trial, all adult patients, primary ACL reconstruction, original research investigation, and minimum 12 months' follow-up.

Results: Rehabilitation after anterior cruciate ligament (ACL) reconstruction should consider control of postoperative pain and swelling, protection of the healing graft, restoration of full range of motion symmetric to the contralateral knee, strengthening of the muscles that stabilize the knee, hip, and trunk, enhancing neuromuscular control, and a gradual progression to functional activities that are required for return to sports. The effects of concomitant injuries and surgical procedures must also be considered in planning an individualized rehabilitation program. A significant proportion of our reconstructed patients do not return to their previous sporting levels. The ability of the patients to return to sports after ACL reconstruction is governed by various factors which include the postoperative knee function, social reasons, psychological hindrances such as fear of re-injury and even monetary considerations in professional athletes. Fear of re-injury is an important psychological factor for these patients not returning to sports.

Conclusions: The presented results clearly indicate that an accelerated protocol without postoperative bracing, in which reduction of pain, swelling and inflammation, regaining range of motion (ROM), strength and neuromuscular control are the most important aims, has important advantages and does not lead to stability problems. Preclinical sessions, clear starting times and control of the rehabilitation aims with objective and subjective tests facilitate an uncomplicated rehabilitation course. Few objective functional criteria are used to determine when patients return to unrestricted sports activities. Clinically feasible recommendations are made for measurement of muscle strength, lower limb symmetry, lower limb neuromuscular control, and ligament function in patients who desire to return to athletics after ACL reconstruction. There is a significant psychological component to return to previous sporting levels in patients after ACL reconstruction.

Key words: ACL reconstruction, rehabilitation

THE CHALLENGES OF LOW BACK PAIN

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Low back pain (LBP) is one of the most common and potentially disabling pain conditions. Despite the frequent occurrence yet to date it has been relatively under-funded regards to diagnosis, patophysiology oriented treatments and effectiveness of wide range of therapeutical interventions. Management of low back pain has been described as arbitrary, inappropriate, or ineffective.

LBP are classified according to pathoanatomic and/or clinical features, including movement based classification, whereas fewer studies utilized a psychosocial and even less, a biopsychosocial approach, but there is still no system which is internationally established, effective, reliable and valid.

Pain as a prominent phenomenon of LBP may impact all three domains of functionality: cognitive, psychosocial and physical ability. The details on pain induced changes in each of these domains are still not well understood. Pain intensity is associated with poor physical functioning but impact of indirect effects of pain through the concomitant cognitive and psychosocial changes are unknown. Further researches are necessary to explain how pain impact on cognitive and psychosocial functioning could additionally worsen the physical abilities.

Patophysiology of pain could be different during the course of disease and between patients. About 10% of patients develop neuropathic component. One of the main challenge is to identify factors associated with a chronic course regards the fact that at 12 months follow-up, the percentage of the patients still had back complaints ranged from 26-45%.

Evidence from randomized controlled trials demonstrates that there is low quality evidence for the effectiveness of exercise therapy compared to usual care, there is low evidence for the effectiveness of behavioral therapy compared to no treatment and there is moderate evidence for the effectiveness of a multidisciplinary treatment compared to no treatment and other active treatments at reducing pain at short-term in the treatment of chronic low back pain. Few available evidence for acute and subacute LBP is not enough to draw rational therapeutical rehabilitation approach. The heterogeneity of the populations, interventions, and comparison groups are the main characteristics of available studies. Additionally it seems that many conclusions of studies of exercise and physical therapy for low back pain have been based on statistical significance of results rather than on clinical importance.

PUBLISHED REVIEW DATA OF LOW LEVEL LASER THERAPY IN NECK PAIN SYNDROME

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Approximately 10% to 15% of the world's populations suffer from an episode of neck pain at any time. Neck pain is a one of the most frequent condition negatively impacts on overall health status and the causes of dysfunctions due to an increase in intensity of pain and decreasing of level quality of life. 40% of the population will suffer from neck pain over a 12-month period. Causes of pain vary from myofascial strain/sprain to myelopathy. Several guidelines on the management of neck pain have been published. However, there remains no definitive consensus on this topic. Although acute neck pain generally resolves with conservative treatment.

Low level laser therapy (LLLT) was used to treat a variety of musculoskeletal conditions including neck pain syndrome, despite a lack of strong scientific evidence and consensus supporting its efficacy. The exact mechanisms of action are still unknown, although some proposed physiological effects include anti-inflammatory action and reduction of oedema and pain. One of the main problems in evaluation of LLLT effects is the extremely wide variations seen in terms of crucial laser beam parameters, methods of application and site- specific doses. Despite the fact that the WALT as early as 2006 recommended that the energy dose in clinical investigation should be expressed in J instead of J/cm², these two parameters are still often switched in a number of current published studies. This confusion affects the validity and reproducibility of such studies. Even when the both parameters are shown in studies, the calculations often are incorrect, and therefore, results regarding LLLT in neck pain syndrome are misleading.

Due to high clinical heterogeneity, different pathophysiological substrate and actual clinical stages examined in different investigations involved in cervical syndrome (non-specific neck pain, myofascial pain syndrome, cervical osteoarthritis, CDS and radiculopathy), the published data was inappropriate (Brzezinska B.1993, Vahtin V I. 1994, Kulinski W 1994, Bjordal JM 2003, 2006,2012, Lopes Martins RIB 2007).

In the studies they observed that net energy doses between 6J and 10J had significant anti-inflammatory effects using a continuous wave 830-nm laser, while net doses of 12J and above gave lesser or insignificant results. LLLT delivered at low doses tends to work better than the same wavelength delivered at high levels, which illustrates the basic concept of biphasic dose response or hormesis (Calabrese 2005).

Moreover, several dose-finding laboratory studies have "recently shown us that more is not necessarily better, and that the positive effects may in fact be lost in overdosing LLLT.

Because of the above mentioned reasons criticism persists as to how conclusions were reached with regard to the efficacy of LLLT in neck pain syndrome in published papers, as well as in systematic meta-analysis.

Key words: neck pain syndrome, low level laser therapy, site specific doses, laser beam parameters

O – 001

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**EXERCISE TESTING AND AEROBIC TRAINING IN PATIENTS IN SUB-ACUTE STAGE
AFTER STROKE**

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Introduction: The aim of the study was to determine if individually prescribed aerobic training, based on stress testing, improves cardiovascular performance of patients in the subacute period after stroke.

Materials and methods: The aerobic capacity of stroke patients (with first stroke and adequate physical and cognitive ability to take part in testing) was measured by stress testing using adapted bicycle (Corival Recumbent - Lode) at admission and discharge from the inpatient subacute stroke rehabilitation. The RAMP protocol was used increasing the work load by 2 or 3 W every 11 seconds. Blood pressure was measured with a non-invasive automatic measuring device, heart rate and ECG curve were monitored. The aerobic training on the exercise bike was prescribed individually according to the stress testing results. The training was performed once or twice a day at 80% of heart rate reserve intensity, for 5 to 6 weeks, the duration of training time progressively increased every week. In addition standard stroke rehabilitation programs were carried out 5 days per week at least 3 hours per day.

Results: Fifteen stroke patients meeting the inclusion criteria were included in the pilot study, mean age 49.7 years (SD 14.2), ten suffered hemorrhagic stroke, five ischemic stroke, 13 patients with right sided hemiparesis, mean time from the onset of stroke 124 days (median 112 days). The mean achieved load at the stress testing at admission was 81 W (SD 37), mean VO₂ max 18,3 ml/kg/min (SD 3,3) and at the stress testing at discharge 93,7 W (SD 37) and 20,7ml/kg/min(SD 4,4), respectively. On average the increase of the patients' aerobic capacity was 18.2% (7% to 39 %).

Conclusion: On the basis of the stress testing prescribed aerobic training improves cardiovascular performance of patients in the subacute period after stroke. To assess the role of standard stroke rehabilitation programs for improving the aerobic capacity, the control group will be include in future.

Key words: stroke, exercise testing, aerobic training

**CORRELATION BETWEEN THE SCORES OF FUNCTIONAL INDEPENDENCE MEASURE
AND BERG BALANCE SCALE AFTER INPATIENT REHABILITATION IN STROKE
SURVIVORS**

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Introduction: The sequelae of stroke are frequent motive for admission in rehabilitation centers. In our service, patients are evaluated at admission and discharge with the Functional Independence Measure (FIM), a multidimensional scaling with 2 main areas: motor (13 items) and cognitive (5 items), and with the Berg Balance Scale (BBS), to evaluate the evolution of the performance globally and in the specific area of balance. The BBS assesses the functional performance in 14 items related to tasks often used in everyday life. Each is rated from 0 to 4 points. The goal of this study was to evaluate the outcome of the inpatient rehabilitation program, regarding balance (measured by BBS), and if they correlated positively with the functional gains, measured by FIM.

Materials and Methods: Prospective, non - interventional study. Cohort of 159 patients treated between 11/08/09 and 21/02/12. Patients included were aged 24 to 88 years, all stroke survivors, undergoing an inpatient rehabilitation program, including improvement of motor performance as one of the main goals. The scales used were FIM and BBS. The results were statistically analyzed with Paired Samples T-test, Pearson Correlation Test (confidence intervals were defined at 0.001).

Results: From a total of 159 evaluated, we obtained a sample of 131 patients who had FIM and BBS records at admission and discharge from hospital. Of the latter, 39.7% were female and 60.3% male, with an average age of 60 years. The majority (75%) had ischemic stroke. They had left hemiparesis in 47.3%, right hemiparesis in 50.4% and tetraparesis in 2.3% of cases. Regarding FIM, the variations in total score and motor sub-score were in average 64 to 89 and 43 to 64 respectively. The difference between initial and final scores was significant ($p < 0.001$). The average BBS was 19 at admission and 33 at discharge, and the difference was significant ($p < 0.001$). The correlation between the variation FIM total scores, FIM motor sub-scores and BBS scores during the inpatient treatment was positive and significant ($p < 0.001$).

Conclusions: These data suggest that our inpatient rehabilitation program for stroke survivors was beneficial, with significant improvement of functionality measured by FIM, including motor functions measured by FIM motor sub - scale. Furthermore, these outcomes correlated positively with the gains found in balance control, measured by BBS.

Keywords: Stroke, neuro - rehabilitation, balance, functioning

O – 003

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NEUROREHABILITATION (COST-BENEFIT ANALYSIS)

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Introduction and aims of the study: Although the main problem in fact is pathophysiological, the great amount of brain plasticity and capability for functional reorganisation, allow us to modify abnormal musculoskeletal motor, such as, the other brain functional schemas and to stabilise motor control at the level that exerts volitional movements.

Purpose: According experience in our institution we prefer, in situations of reaching plateau in the brain lesions recovery, implementation of additional therapeutic procedures such as: cooling muscles, PNF kinesiotherapy and electroneurolysis.

Methods: In evoking therapeutic benefits we tried with various curative methods, predominantly PNF kinesiotherapy and electrotherapy (TENS+FES), to stimulate patients motor control to be exerted on higher level, which expresses on their functional capabilities, on few phases: 1. Hand skills, 2. Locomotion, 3. Selfcare, 4. Socialisation, 5. Individuality. All phases can be monitored by some measuring instrument, such as: Ashworth scale, Fugl-Meyer scale and FIM Index.

Results: We managed to reintegrate patients in environment, e.g. to help them to become effective, efficient in social stuffs and economically independent.

Conclusions: It's evidently, that management of ICH and TBI patients, in estimated series, needs improvement, somewhat due to acceleration of adopting them to rehabilitation centers, somewhat, in attempt of optimising rehabilitation goals.

According demands for individual benefits, one may resume, that sum of material or direct, also as indirect savings, in neurorehabilitation, estimated by this analytic method was evident.

According this results, convalescents, more then ever, obtained selfindependency. Meanwhile, many of them reach an working ability, which means, not only, that they continue to earning enough money for them, but at amount that allow to invest in health policy and social society funds, equal as the other workers.

AUTONOMY IN AMBULATION IN STROKE SURVIVORS – OUTCOMES OF AN INPATIENT REHABILITATION PROGRAM, MEASURED BY FIM AND FAC

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Introduction: Stroke is one of the main causes of incapacity in developed countries. A number of factors may influence the functional prognosis of patients. The possibility of being included in a comprehensive inpatient rehabilitation program is of major relevance to the achievement of the best possible functional status, autonomy and quality of life. The Functional Independence Measure (FIM) is a widely used outcome measurement. It has 18 items and is scored 18 to 126. Motor FIM sub-scores range from 13 to 91, and cognitive FIM sub-scores range from 5 to 35. The Functional Ambulatory Categories (FAC) measures the ability to ambulate autonomously, and it is scored 0 to 5. The purposes of this paper were: to evaluate the functional achievement of stroke survivors during inpatient rehabilitation, measures by FIM; to investigate the correlation between the changes in FAC scores and FIM motor sub-scores occurred during the inpatient rehabilitation phase.

Subjects and Methods: This was a retrospective study based on data collected from the medical files of 159 stroke survivors treated as inpatients in an adult rehabilitation Service, between 11/08/09 and 21/02/12. Ages varied from 24 to 88 years. Functional status was evaluated and measured at admission and discharge using FIM. The ability to ambulate was measured at admission and discharge by FAC. The score changes and the possible correlation between the gains measured by these 2 instruments were investigated. The results were statistically analyzed with Paired Samples T-test, Pearson Correlation Test (confidence intervals were defined at 0.001). **Results:** From a total of 159 patients we obtained a sample of 133, which were evaluated with both FIM and FAC at admission and discharge. They were aged 59 in average. There were 59,3% of males and 40,6% of females. Ischaemic stroke accounted for 74%, of which 47% had left hemiparesis, 49.6% had right hemiparesis and 3% had all 4 members affected. FIM total scores changed from 64 to 89 in average. FIM motor sub-scores changed from 43 to 64 in average. The difference between admission scores and discharge scores was statistically significant for both scales ($p < 0.001$). Regarding FAC, 38% of subjects were unable to walk at admission. FAC average score at admission was 1, and it was 3 at discharge. This difference was statistically significant ($p < 0.001$). The correlation between FIM total scores, FIM motor subscores and FAC scores was clearly positive and significant ($p < 0.001$).

Conclusions: There were 133 of the 159 patients, who met the study criteria. These patients had clear functional gains, revealed by the three outcome measures, and the change was statistically significant. There was a strong positive correlation between the results achieved and reported.

Key-words: Stroke, ambulation, function, outcomes, rehabilitation

**OBSTETRICAL BRACHIAL PLEXUS INJURY REHABILITATION PROTOCOL - OUTCOME
MEASURE OF EARLY INTERVENTION**

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Introduction: The obstetrical brachial plexus injury (OBPI) is caused by an injury resulting from distension of the brachial plexus nerve structures in newborn (NB) which is usually produced after, before or during parturition. The most relevant risk factors for OBPI are macrosomic infants with cephalic presentation and shoulder dystocia and preterm NB with pelvic presentation and fetal suffering and/or hypoxia. In our PMR Department we perform that all NB with OBPI caused in parturition should have a clinical evaluation by a Physiatrist during the first 48 hours of life and subsequent seriated evaluations during the first months. Those evaluations include observation of affected upper limb attitude, joint active and passive range of motion (ROM), active movement of other limbs, primitive and osteotendinous reflexes, postural reactions, sensibility and shoulder function. We defend that all NB with OBPI should have a continuous rehabilitation treatment during the first 6 months after injury and then the treatment frequency should be revised and adjusted to each case. Rehabilitation program main objectives to OBPI are the maintenance of the complete joint range of motion and to enhance the muscles without injury associated. Other goals are to stimulate the contraction of paretic muscles, avoid limitation of range of motion and maintain correct cortical patterns of movement. Scientific literature on OBPI issue as the consensus that early intervention is the key point in rehabilitation program. In summary, our Hospital Protocol Performance in OBPI is based on theoretical model that faces this clinical entity as an acute peripheral neuropathy secondary to a traumatic event in which early therapeutic approach is critical and should consider three basic principles: rest, increasing of motor and sensibility pattern of the affected limb and prevention of muscles imbalances.

Materials and methods: Retrospective study of the evolution of the newborns referred for first consultation of Pediatric Rehabilitation by a paediatrician. Inclusion criteria: NB with OBPI with first assessment in 2012 and that ended the Rehabilitation Protocol till June 2013. To assess the clinical evolution we collected data from informatic clinical file that included the Moro reflex and grip; active elbow flexion (based on Active Movement Scale) and shoulder abduction (based on Gilbert scale). **Data collection:** Consultation of hospital computer records relating to consultations cited. To provide the statistical analysis we determine the age at beginning of the programme, the average time integration protocol and evaluated the changing on clinical scores of motor function between the entrance and discharge of the protocol.

Results: We defined a sample of 28 newborns. The average duration of the protocol was 18 weeks. 85% of the sample had first consultation until the end of second week after birth. Improvement of elbow and shoulder active movement was observed in all newborns. Almost 10% of our sample needed botulinum toxin injection to improve the motion pattern.

Conclusions: The referral made to the consultation was suitable in most cases as the majority of the authors argue that infants with suspected OBPI should be referred in the first 15 days after birth. The authors also defend the early referral for allowing teaching parents the correct placements and postures to help reduce the potential functional restriction in the future.

Key words: obstetric palsy; brachial plexus palsy; rehabilitation

MORPHOPHYSIOLOGICAL EVALUATION AS DIAGNOSTIC TOOL IN CHILDREN WITH SPINAL DYSRAPHISM

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Introduction: Spinal dysraphism (SD) present congenital anomaly with multifactorial inheritance. Possible genetic role was evaluated in numerous studies both on molecular and population genetic level. The purpose of this study is to evaluate morphophysiological expressions between healthy individuals and patients with SD.

Material and methods: We have evaluated 90 patients with SD (50 patients with spina bifida occulta – SBO and 40 patients with spina bifida aperta – SBA) from Serbian population. The control group of 100 individuals without SD were randomly selected from Serbian population with similar socioeconomic status and age. Presence of several morphological traits were analyzed in patients with spina bifida occulta (eg. hypertrichosis, gluteal line assymetry, fovea spinalis, hypo/hyper-pigmentation). Also, presence of 9 homozygous recessive traits (HRT) from head region in each individual were analyzed.

Results: Presence of morphophysiological traits was significantly more frequent in patients with SBO compared with control ($p < 0.05$). There is decrease in number of phenotype classes for patients with SD versus healthy individuals (SD-48/Control-58). In group of SD patients the most frequent number of phenotype classes are combinations with 3 and 4 HRTs, while for healthy individuals between 2 and 3 HRTs. Between SBO and SBA groups of patients there are no significant changes in number of phenotype classes for tested HRT (SBO-32 phenotype classes/SBA-34 phenotype classes).

Conclusions: Our results pointed out that there is increased homozygosity and decreased variability for tested genes responsible for evaluated characteristics in patients with SD compared with control. These findings may point out that some phenotype classes (phenotypes) are more liable for the expression of SD.

Key words: spinal dysraphism, morphology, phenotype classes, children

BAROPODOMETRIC EVALUATION OF CHILDREN AFFECTED BY OBSTRUCTIVE SLEEP APNEA SYNDROME: A PILOT STUDY

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Introduction: Obstructive Sleep Apnea Syndrome (OSAS) is characterized by recurrent episodes of obstruction of upper airways, with absence or reduction of at least 50% of breathing, mainly caused by pharynx collapsing. In pediatric patients with OSAS, abnormal postures are frequent not only during sleep. Recent studies suggest that there might be an association between tongue mobility alteration during deglutition and the development of both occlusal and postural breathing dysfunctions. Therefore rehabilitation is based on strengthening exercises of the tongue, oral and facial muscles. During sleep, the tongue should be hold up with dorsal and terminal portions in contact with the *rugae palatinae* located on the anterior side of the palate behind the *papilla incisiva*.

The aim of this pilot study is the evaluation of the variations in the podalic support and in the oscillatory surfaces in children affected by OSAS.

Materials and methods: We evaluated seven children affected by OSAS (3 males, 4 females; mean age 9.32 years; SD 2.60) diagnosed with cardio-respiratory polysomnography at the Child and Adolescent Neuropsychiatry Service of the Second University of Naples. Moreover, all subjects performed baropodometric examination in static position and the stabilometric evaluation with opened (OE) and closed eyes (CE). In particular, in the static examination we focused on the total surface of feet and on the lower limbs load distribution with OE-opened teeth (OT) in normal occlusion, with OE-closed teeth (CT), with OE and the tongue in contact with *rugae palatinae*, behind the *papilla incisiva* (RP), with OE- dental cotton rolls (R). The stabilometric examination evaluated the ellipse surfaces and the mean speed of oscillation with OE-CE, lingual spot, closed teeth and rolls.

Results: In static, the mean of load surfaces is 162.75 cm² OE-CT; 167.32 cm² OE-CT; 179.82 cm² OE-RP; 160.04 cm² OE-R. The average of load distribution between the two lower limbs underlines a left overload in all the exams: 57.34% OE-OT; 57.51% OE-CT; 56.04% RP; 58.57% R. The stabilometric examination showed mean of ellipse surfaces is 73.81 mm² OE-OT; 49.19 mm² OE-CT; 53.89 mm² OE-RP; 63.89 mm² OE-R; 37.10 mm² CE-OT; 51.04 mm² CE-CT; 32.91 mm² CE-RP; 61.54 mm² CE-R. Moreover, the mean speed: oscillation was 5.90 mm/sec OE-OT; 5.43 mm/sec OE-CT; 5.38 mm/sec OE-RP; 5.85 mm/sec OE-R; 5.56 CE-OT; 5.13 mm/sec CE-CT; 4.57 mm/sec CE-RP and 5.69 CE-R.

Conclusions: These preliminary findings may suggest that children with OSAS present a surface load with OE-OT lower than with OE-CT and OE-RP and higher than with OE-R. Moreover, the mean reduction of the ellipse surface and in the mean speed with OE-RP respect of OE-OT could suggest the role of lingual-palatine stimulation for the postural balance and for the oscillation regulation system.

Keywords: Baropodometric examination, stabilometric examination, children, OSAS

THE EFFECT OF SCHROTH'S EXERCISES ON CORRECTION OF BAD POSTURE BY SCHOOL CHILDREN

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Introduction: Bad posture by school children can be increased by many external factors like school bags, not ergonomic furniture, clothes and long bad posture in front of video terminals. It is good to be early recognized and treated to prevent functional disorders.

The aim of our study was to assess the effect of Schroth's spine exercises on correction of bad posture and function of lungs.

Material and method: the 80 school children age 10 years, were evaluated before and after treatment with three checking methods: 1. four clinical examination test (upper arm, Adams's test, Test by Mathias and test for shorter legs muscles), 2. Skin surface method with Spine mouse device and spirometry.

Results: the effect of exercises was significant with all three checking methods. The children were treated in period of two months, three times per week, 40 min. class.

Discussion: More and more children have long bad posture and it is increased with decrease of physical activity and sitting a long time in front of video terminals. The 10% of those children can be with risk to become structural deformity. Elimination of outside factors and inclusion of exercises can be a prevention activity in and outside of school programs. Conclusion: Schroth's exercises give a significant $p < 0.05$, goodness of correction of curve by clinical test and reduction of hyper kyphosis. They have positive effect on functional lungs status with increase of vital capacity.

Key words: bad posture, Schroth's exercises, correction

O – 009

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THE ROLE OF PRM AT PRIMARY HEALTH CARE CENTERS

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Rehabilitation medicine can be defined as the medicine of human functioning.

According to the World Health Organization (WHO1994) Community Based Rehabilitation (CBR) is a strategy within community development for the rehabilitation, equalization of opportunities, and social integration of all people with disabilities.

Primary Health Care (PHC) needs to address the main health problems in the community, providing promotive, preventive, curative and rehabilitative services. PHC personnel can facilitate links between people with disabilities and special services.

Studies and analysis of the World Bank demonstrate widely spread, both absolute and relative poverty in the countries of our region.

In Belgrade, Podgorica, Zagreb, and the others in this region, there are departments of PRM, as a part of PHC centers, where work, depends on number of habitants, some specialists of PRM, with therapists. They take care about treatment and rehabilitation after trauma, in musculo-skeletal, neuromuscular disorders, after trauma, prevention in childhood according to postural disorders, scoliosis, and others. Our aim is to improve PRM in PHC centers, to develop as CBR.

As Community Based Rehabilitation aims at activities of the community to improve quality of life of people with disabilities, PRM can contribute to the strategy of CBR. PRM in outpatient settings can contribute on three levels: giving advice to communities teaching primary care physicians and other medical specialists case management for people with disabilities.

Key words: prm, cbr, phc

O – 010

Abstract No.: 13738272785947

**EVALUATION OF REHABILITATION PROGRESS USING THE FUNCTIONAL
ASSESSMENT MEASURE (FIM+FAM)**

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Introduction: The objective of this work is to quantify functional gains of a group of patients subjected to a rehabilitation program in a Portuguese General Hospital using the Functional Assessment Measure (FIM+FAM).

Materials and methods: Observational study using admission and discharge data from patients admitted to the Rehabilitation Department of Faro Hospital in the time period between January 1st and December 31st 2012. Patients were divided according to the following diagnostics: Stroke, Traumatic Brain Injury (TBI), Spinal Cord Injury (SCI) and Complex Orthopaedics Injuries (COI). The FIM+FAM scores were statistically analysed using the Statistical Package for the Social Sciences version 18 of Windows (SPSS).

Results: 20 patients met the inclusion criteria. 14 (70%) were male and 6 (30%) were female. The average age at admission was 53 years, ranging from 17 to 85 years. The average length of stay was 47 days (minimum 7 and maximum 162 days). The most frequent diagnostic group were the Stroke – 9(45%); SCI – 5(25%); TBI – 3(15%); and COI – 3(15%).

Average FIM+FAM at admission was 90,6/210 (minimum 28, maximum 169), and at discharge 142,6/210 (minimum 74, maximum 207). The average gain of FIM+FAM was 52/210 this was found to be statistically significant by the Wilcoxon test ($p=0,001$).

Conclusions: This study characterized the inpatients at a rehabilitation department in Acute General Hospital during the year 2012. The Portuguese version of FIM+FAM was found to be useful and practical tool in assessing functional gains of this group of patients.

Key words: FIM+FAM, functional recovery, rehabilitation

O – 011

**THE USING OF THE BALNEO CLIMATE FACTORS AND THERAPY IN JORDAN IN FIELD
OF PHYSICAL AND REHABILITATION MEDICINE**

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A complete study for climate factors and natural agents available in Jordan which may be used, in Balneo Climatic Therapy.

- Concerning: the climate in Jordan classified in general as Mediterranean climate (Macro climate) and particular as local climate (Micro climate). Four types of climate have been mentioned (under sea level, sea level, mountain, desert climate).

- Concerning natural agents they are classified as two types (Natural mineral water and Mud). As for mineral water it has been classified from the physical point of view as the following: hypothermic, thermic, hyperthermic water and from the chemical point of view as: sulfuric water, carbonic water, radon water. The mud has been classified into two types (organic mud and inorganic mud).

Special characteristics of the Dead Sea Region has been proved in their positive results for psoriasis, certain rheumatic disease, certain locomotors & respiratory system.

SIMULTANEOUS BILATERAL QUADRICEPS TENDONS RUPTURE IN A PATIENT WITH POLYNEUROPATHY – A CASE REPORT

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Introduction: Simultaneous bilateral quadriceps tendon rupture is a rare injury, and generally occurs in men over the age of 50 who are diabetics, obese, or have age related changes in their tendons (1). Other factors leading to tendon rupture mostly in younger individuals include local steroid injections, use of anabolic steroids, history of chronic tendonitis, chronic renal failure, hyperparathyroidism, rheumatoid arthritis, systemic lupus, and gout (2). A similar case of bilateral quadriceps tendons rupture after statin use has been described (1). These predisposing conditions cause tendon degeneration by altering collagen synthesis, causing sclerosis or fibrosis in the tendon, fatty degeneration, decreased tendon collagen composition, necrosis, or calcification (2).

Case report: A 66-year-old man with a history of sensory - motor polyneuropathy of unknown etiology, presented to the emergency department with bilateral suprapatellar knee pain and swelling after a fall. He was unable to walk or actively extend his knees after the incident. Radiographs of the knees showed abnormal soft tissue contour in the suprapatellar region and abnormal calcific opacities several centimeters cephalad to the patella in both knees. Bedside ultrasound using a high-frequency linear probe was performed (1). The high-resolution images showed irregular thickening and retraction of the quadriceps tendons which were attached to hyperechoic foci well above the patella; in addition anechoic fluid collections were identified. These findings confirmed the clinical and radiographic diagnosis of bilateral quadriceps tendon rupture with avulsion of the superior pole of the patella, and acute hematoma in the suprapatellar bursa. One day after the accident, the patient underwent surgery with primary repair of both quadriceps tendons. His legs were then immobilized in full extension by tutor casts for 6 weeks. The injury was suspected to be associated with the polyneuropathy as the patient had no other identifiable risk factors.

Conclusions: The quadriceps tendon is an inherently very strong structure that is extremely resistant to heavy load (3). The tendon can rupture spontaneously or as a result of trauma. The most common cause of simultaneous bilateral quadriceps tendon rupture appears to be either fall (4), or a sudden, violent eccentric contraction of the quadriceps mechanism against the body weight, with the knee slightly flexed and the feet in a fixed position (2) (3). The commonest site of rupture is the osseotendinous junction (4).

Early diagnosis in quadriceps tendon rupture is important, because a delay in treatment can result in considerable morbidity; tendon retraction, fibrosis, and atrophy reduces the possibility of successful operative repair (5).

Plain radiographs of both knees revealed a calcified opacity superior to the patella, eventual result of chronic tendinopathy (3).

Ultrasound is an inexpensive, sensitive, simple and reliable method in diagnosing tendon ruptures, whether partial or complete, at the bedside. This technology could show with high degrees of sensitivity and specificity the bilateral lesion in the quadriceps tendons.

Key words: quadriceps tendon, rupture, polyneuropathy, ultrasound, X-Rays

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EFFECTIVENESS OF MESOTHERAPY IN MUSCULOSKELETAL PAIN SYNDROMES

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Introduction: Mesotherapy is a minimally invasive procedure that consists of local intradermal therapy with pharmaceutical or other bioactive substances given in small quantities through dermal multi-punctures, where the injection site corresponds to the area of the pathological condition. The goal of this study was to evaluate the patients' satisfaction and the efficacy mesotherapy in the treatment of musculoskeletal pain syndromes.

Materials and methods: We selected a convenience sample consisting of 33 patients with painful musculoskeletal syndromes refractory to conventional treatment, who attended the mesotherapy attended outpatient mesotherapy consultation between January and December 2012. Patients were evaluated before and after treatment by numerical pain scale (END) and were subsequently contacted by telephone to assess the degree of satisfaction through a Likert scale.

Results: Most of our patients were females (93.9%) and the mean age was 58.12 ± 22.12 years. Thirteen patients (39.4%) had neck pain, 9 patients (27.3%) low back pain, 8 patients (24.2%) tendinitis and 3 patients (9.1%) had other complaints. The average END before treatment was 7.36 ± 1.45 , and after mesotherapy was 4.97 ± 1.6 , with a decrease in the END of 2.39 ± 1.64 ($p < 0.01$). After the treatments, it was found that 12 patients (36.4%) decreased analgesia or anti-inflammatory medications. Twenty-two patients (66.7%) considered the treatment to be effective and 27 patients (81.8%) would repeat the treatment if necessary.

Conclusions: Although there was been no complete remission in this sample, mesotherapy appears to be effective in reducing the perception of pain in patients with refractory musculoskeletal pain syndromes.

Key words: mesotherapy; musculoskeletal pain syndromes

EFFICACY OF TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION AND EXERCISE ON PAIN AND FUNCTIONS IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Introduction: Various treatments are suggested for the chronic low back pain (LBP), from active physiotherapy, joint manipulation, to the different types of physical agents. Still, there is no consensus about the optimal therapeutic approach. A recent focus in the physiotherapy management of patients with LBP has been the specific training of muscles surrounding the spine (deep abdominal muscles and lumbar multifidus), considered to provide dynamic stability and fine control to the lumbar spine.

The aim of this study was to evaluate the therapeutic effect of TENS and specific exercise therapy in patients with chronic low back pain.

Materials and methods: The study included 44 patients (24 male, 20 female, age 45±6.3 years), with the low back pain (LBP) symptoms without pain extension into the lower limbs, persisting over 3 months, with the pain intensity maintained at a stable level with oral nonsteroidal antiinflammatory drugs (NSAIDs). Patients were randomly assigned to one of three groups, and treated with TENS – 20Hz, 15 minutes duration (group A, n=15), or exercise therapy - specific exercise treatment program involving the specific training of the deep abdominal muscles, with co-activation of the lumbar multifidus proximal to the pars defects (group B, n=15), or received NSAIDs with no physiotherapy treatment (control group C, n=14). TENS and exercise therapy were applied daily, 5 days per week, during 3 consecutive weeks. The effects of therapy were evaluated by means of pain assessment (a 10-cm visual analog scale VAS; 0–10, where 0 is no pain and 10 is the worst pain ever), lumbar mobility measured by the Schober measurement, and disability measured with the Oswestry disability questionnaire, on admission to the study, after 3 weeks of therapy, and 6 weeks after the end of therapy.

Results: No adverse effects were observed during the treatment. Treatment with both TENS and exercise therapy caused significant pain reduction ($p<0.01$) and improvement of lumbar mobility ($p<0.05$), compared with control group, but with no significant differences for any outcome between the exercise therapy and TENS group after 3 weeks of therapy. The specific exercise group showed statistically significant greater reduction in pain intensity and functional disability levels at a 6-week follow-up compared to TENS group. At the end of follow up period no significant difference was observed between patients treated with TENS and non-treated patients.

Conclusions: Both TENS and exercise therapy are effective methods in reducing pain and functional disability in the therapy of chronic LBP. In chronic LBP specific exercise therapy is more beneficial than TENS or NSAID in the long term.

Key words: Low Back Pain, TENS, Exercise Therapy

THE OSWESTRY DISABILITY INDEX (ODI) AS EVALUATION TOOL OF OUTCOME IN PATIENTS AFTER LUMBAR DISC SURGERY THREE MONTH FOLLOW UP

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Introduction: Almost 80% of people, at least once in life, have back pain with or without leg pain. Lumbar disc herniation is in 95% of cases cause of lumbar radiculopathy. In about 10% of these patients there are indications for surgical treatment.

Aim of this study was to determinate the effect of surgical treatment of lumbar disc herniation on activities of daily living through Oswestry Disability Index (ODI).

Materials and methods: Prospective, clinical study included 30 patients with lumbar discectomy, operated in Clinic for Neurosurgery, Clinical Center of Serbia. We used ODI, in serbian language, with the patients filled before operation, one month after, and three months after lumbar disc surgery. All patients were included in early rehabilitation treatment of the algorithm of Clinic for Physical medicine and rehabilitation, Clinical Center of Serbia. After they release from hospital they conduct recommended kinesitherapy program at home. All 30 patients were in rehabilitation, in stationar institution specialized in rehabilitation, duration of 21 days, one month after operation. Student's t test for paired samples is used for statistical data analysis.

Results: 16 (53,3%) patients were women, and 14 (46,6%) were male. Average was 31,5 years old. Average ODI were 51,8% before operation, 24,8% one month, and 16,7% three month after operation. 29 patients (96%) had significant improvement regarding test results which include preoperative data and data on first checkup, a month after operation, and only one patient had worse results. Two months after first checkup, and stationary secondary rehabilitation, 25 patients (83,3%) showed new improvement on second checkup compared to results from first checkup. For reliability coefficient $\alpha=0,05$ there is statistical significant difference between data collected in preoperative period and on first checkup and also between data collected on first and second checkup.

Conclusions: Well done surgical treatment, and timely measures of early and secondary rehabilitation lead to improvement in patients after lumbar discectomy three month follow up which is shown by ODI, the 'gold standard' of low back functional outcome tools.

Key words: Oswestry Disability Index, lumbar discectomy, early rehabilitation

**EVALUATION OF SPECIFICITY AND SENSITIVITY OF CLINICAL TESTS THROUGH THE
ELECTROPHYSIOLOGICAL DIAGNOSIS OF SCIATICA**

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Introduction. Sciatica is defined as pain in the distribution of the sciatic nerve caused by pathological changes of the nerve. Common clinical signs of sciatica are painful thrust vertebra (Bell), limited anteflexion (Schober), painfully raising stretched legs (Lazarevic), dropout dermatome, miotoma or reflexes. EMG of the lower extremities is objective and highly reliable diagnostic method for testing suspected sciatica.

The goal: Define sensitivity and specificity of clinical tests that indicate the existence of sciatica, diagnosed by EMG examination.

Patients and methods: The basic sample consisted of 100 patients of both genders, aged between 20 and 65 years. Inclusion parameters for participation in the study were severe pain in the lower back with the expansion to one or both feet for a period of one to three months and clinical features that clearly suggest the existence of radicular lesions. Clinical examination was performed immediately before the electrophysiological study, which is a common practice. Electrophysiological confirmation of acute sciatica involved the registration of acute denervation in the studied muscles and long polyphase motor unit potentials in the percentage greater than 30%. **Results:** The random sample, balanced by gender (50 women, i.e. 50%). As for age, the mean was 50.0 (SD 10.7) years. EMG examination has electrophysiologically proven acute radiculopathy in 64 patients. The most common clinical signs in the total sample of patients with a clinical picture ischialgia are Shober's test (61%) and Lazarevic's sign (57%). Three clinical trials have shown significant relation to electrophysiologically verified sciatica, through statistical analysis: positive test Lazarevic, paresis of certain muscle groups, and the absence or reduction of the patellar and Achilles reflexes. Positivity of four or more clinical trials was statistically the best threshold with specificity of 67% and sensitivity of 56%.

Conclusion: Diagnosis of sciatica is primarily clinical and is based on characteristic clinical trials.

TRIGGER FINGER TREATMENT: EFFECTIVENESS OF STEROID INJECTION

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Introduction: Flexor stenosing tenosynovitis or trigger finger is a frequent source of pain and disability of the hand. The aim of this study is to access effectiveness of the treatment of trigger finger with steroid injection into the flexor tendon sheath at the A1 pulley.

Materials and methods: The medical files of a cohort of patients with trigger finger submitted to steroid injection into the flexor tendon sheath were reviewed. Patients diagnosis over a period of 62 months since January 2008 were considered. 75 patients with a total of 94 trigger digits were included. The fingers were injected into the flexor tendon sheath at the A1 pulley. 8 fingers were injected with 0.5 mL of methylprednisolone (40mg/mL) and 1 mL of lidocaine 1% and 86 fingers with 0.5mL of triamcinolone and 1 mL of lidocaine 1%. The minimum considered follow up was 3 months. The outcome measures were cure, relapse and surgery due to pharmacological failure. Factors associated to outcome measures were explored by univariate analysis.

Results: 75 patients were included (60 females), mean age 63.95 years (± 10.33), age ranges 31 to 87 years in females and 47 to 86 years in males. 63 patients were treated for single digit and 12 for multiple digit involvement. The fingers most frequently affected were the thumb (n=38) and the middle finger (n=28). Most of the fingers were from the right hand (n=51). Cure with a single injection occurred in 77.7% (CI95% 68.4-85.2), relapses in 20.2% (CI95% 13.0-29.2) and surgery was required in 2 fingers from different patients. Cure occurred in 80.2% (CI95% 70.8-87.6) of patients treated with triamcinolone and 50% (CI95% 18.4-81.6) with methylprednisolone (Fisher's exact test $p=0.071$). There was no statistically significant difference in terms of effectiveness between the different fingers affected. The cure rate ranged from 65,2% to 100% for the different fingers (n.s.). No associations were found between cure and number of affected fingers or diabetes. No complications were registered.

Conclusions: The success rate of steroid injection for treatment of trigger finger was high and surgery was seldom required. Triamcinolone may be more effective than methylprednisolone. No predictors of failure were found. The technique was safe when executed by experienced clinicians. Further studies are necessary to clarify which steroid may have better outcome and witch factors may influence outcome.

Key words: trigger finger, steroid injections, effectiveness, cure, relapse

LONG TERM FOLLOW-UP OF COMPREHENSIVE PHYSIOTHERAPY FOLLOWING DISC HERNIATION SURGERY: RESULTS OF A RANDOMIZED CLINICAL TRIAL

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Introduction: Hitherto no comprehensive long-term follow - up data of 10 years and more have been obtained from survivors of disc surgery that would have considered the type of postoperative care. Thus this study aimed at evaluating the long-term effects of postoperative comprehensive physiotherapy starting 1 week after lumbar disc surgery.

Materials and methods: This is the 12 years' follow-up of a three-armed, randomized, controlled, single blinded clinical trial which took place at an outpatient department of PM&R. Of 111 patients following first-time, uncomplicated lumbar disc surgery who participated in the original study and completed the treatment originally allocated, 74 (67%) completed a 12 years follow-up examination. In the original study, patients had been randomly assigned to "comprehensive physiotherapy", "sham intervention" (neck massage), or no therapy. The main outcome measure was the Low Back Pain Rating Score (LBPRS; Manniche 1993).

Results: At 12 years after surgery, the group undergoing "comprehensive physiotherapy" had significantly better functional outcomes as rated on the LBPRS than the untreated group (mean difference: 13.2 (p=.04). Equally, there was a clinically relevant, almost statistically significant difference between the sham therapy and no therapy (mean difference: 12.5, p=.07). A second sensitivity intention to treat analysis including all patients originally assigned with the last available observation carried forward revealed similar results. No clinically relevant and/or statistically significant between - group differences were found for secondary outcome parameters.

Conclusions: Physiotherapy following lumbar disc surgery may produce long-term health benefits over no intervention, but may not be superior to "sham". One might speculate that "comprehensive physiotherapy" may act through specific and other, non-specific effects in these patients. As postoperative physiotherapy was not superior to a "sham" intervention, professional guidance during the course of postoperative recovery by a clinician seems of utmost importance.

Key words: disc herniation surgery, physiotherapy, exercise therapy, randomized, long-term follow-up

WALKING WITH PROSTHESIS ONE YEAR AFTER LOWER LIMB AMPUTATION OF NONTRAUMATIC ORIGIN

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Introduction: The rehabilitation of patients after lower limb amputation has two goals: achieving functional mobility with prosthesis and successfully integrating the patient into the community. Upon discharge from acute rehabilitation center, most lower limb amputees of nontraumatic origin can functionally walk with prosthesis and some kind of walking aid. However, the maintenance of the ability to walk at the patient's home environment following discharge remains unclear. In the current study we aim to find if patients with nontraumatic lower limb amputation, ambulating with prosthesis at discharge from orthopedic rehabilitation ward, are still using the prosthesis one year later. Our results can clarify whether lower limb amputees of nontraumatic origin are preserving their ability to walk at their home environment within the community.

Materials and Methods: Hospital records of 79 amputees of nontraumatic origin, rehabilitated in the orthopedic rehabilitation department at the Loewenstein Hospital Rehabilitation Center within the last 3 years were analyzed. Age, gender and the main basic medical problem which was the reason of the lower limb amputation, were recorded. Walking ability was analyzed in all patients prior to their discharge from the ward. Patients were invited to visit an outpatient clinic 1 year after discharge, where their walking ability and use of prosthesis at home were analyzed.

Results: 75% of the patients were male; their mean age 62.8 ± 1.3 years. Only 7% of the patients were employed and 83% required some kind of assistance in everyday activities at the moment of amputation. 80% were diagnosed as diabetic patients and 55.7% had peripheral vascular disease. Most of lower limb amputees were at bellow knee level (67%), 30.5% - above knee and only 2.5% - foot amputees. The reason of the amputation was diabetes in 68% of cases and peripheral vascular disease in 20%. The discharge destination for most patients was their home (96%) and they were ambulating functionally in 95% of cases (64% with walker, 30% with cane or crutches and 1% without walking aid). The best predictors of functional walking at discharge according to ordinal regression model are the age of the patient ($p = 0.0059$) and the existence of diabetes ($p = 0.017$). All patients were invited to outpatient clinic one year (372.6 ± 47 days) after discharge, but only 34% (27) of them visited the clinic and were investigated. 81% of patients reported regular use of prosthesis at home while visiting the clinic. They were also checked by a rehabilitation doctor while walking with prosthesis in the clinic. 45% of patients were walking with walker, 18% - with cane or crutches and 18% without walking aid.

Conclusion: Most of the patients admitted for prosthetic rehabilitation after nontraumatic amputation were unemployed and requires some assistance in everyday activities. Most frequent reasons of nontraumatic amputations are diabetes mellitus and peripheral vascular disease. The inpatient prosthetic rehabilitation program succeeded in most of the patients and the result is preserved one year after discharge from the orthopedic rehabilitation ward. The quality of walking even seems to improve during one year of home prosthetic training. This finding is important in planning the acute prosthetic rehabilitation process for nontraumatic lower limb amputees.

Key words: orthopedic rehabilitation, lower limb amputee, walking with prosthesis

OSTEOARTHRITIS OF THE SPINE AND RISK FACTORS

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Introduction: Osteoarthritis (OA) is a common disease that affects articular tissues, causing progressive irreversible damage and the failure of the joint. Pathological changes in OA include also subchondral bone thickening, osteophyte formation and synovial inflammation, which can lead to disability. In addition to the hips, knees and lower back, OA occurs in the neck as well. Spinal OA is one of the common causes of back pain (Horvát et al, 2011). The obesity showed strong link with OA in multiple studies (Coggon et al, 2001). The prevalence of OA increases with age. Relationship between obesity, gender, and degenerative changes in the spine varies in different studies and countries (Zukowski et al, 2012).

Objective: To determine the association of spinal OA with obesity, gender and age within adult population of Banjaluka region.

Materials and method: The study included a retrospective analysis of 7089 medical records of patients with established diagnosis of OA. We used the electronic data base of primary care and CBR units of our region from Jan 2005 till Dec 2010. This study is part of larger epidemiological survey on prevalence of OA and obesity in our region. Diagnosis of OA was based on clinical symptoms, physical examination and X-rays. Analyzed parameters were: age, gender and body mass index (BMI) in patients with OA. The obesity was classed as BMI>30.0 kg/m² (NIH, 2009). The baseline characteristics of the participants are presented as means (SD) and/or numbers (percentages) in relation to BMI and age. Association between OA and BMI, and OA and age were assessed by a che-square test with significance treshhold of 0.05. All statistical analyses were performed using SPSS software version 15.0 (SPSS Inc.2006).

Results: Out of 7089 patients with OA (mean age 50.6 ± 14.2; age range 19 to 91), the number of spinal OA was 5918, with significant increase with age (p<0.01). The number of cervical OA was 1211 (65.2% in women and 34.8% in men; x² = 0.48; p>0.05). Lumbar OA was presented in 4707 participants (52.6% women and 47.4% men; x²= 39.66; p<0.01). Obesity was most evident at age >50 years. From a total of 1787 OA in obese subjects, percentage of spinal OA was 77.9%. The correlation of obesity and lumbar OA was statistically significant (x²=18.9; p<0.01). No statistical significance was fond with obesity and cervical OA (x²= 3.6; p>0.05).

Conclusion: Aging and female gender have a high statistical significance in the development of OA at all sites (p<0.01). There was a high statistical significance between obesity and OA of lumbar spine (p< 0.01), but not with obesity and cervical OA (p>0.05). A significant increase in the prevalence of OA was observed in women during menopause.

This information can be used pragmatically by PRM specialists and family doctors to construct plan for screening, counseling and referring adults with overweight and OA to appropriate obesity prevention and treatment.

Keywords: osteoarthritis (OA), spine, obesity

O – 021

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INPATIENT FUNCTIONAL RESTORATION IN LOW BACK PAIN DISABILITY

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Introduction: Various functional restoration programs are available for persons with chronic low back pain disability (CLBPD), most of them for outpatients.

Materials and methods: The functional outcome of the Loewenstein inpatient CLBPD functional restoration program was evaluated retrospectively. One hundred CLBPD patients with primary ADL deficits (in ambulation, daily activities in sitting and standing positions, washing and dressing lower body), admitted for rehabilitation during 2000-2009, were included. Exclusion criteria were spinal surgery during the 6 months before admission to rehabilitation, neurological deficit with AIS grade A, B, or C, and non-spinal medical problems that may cause disability. Function was assessed using a modified SPIM scale (score range 0-82).

Results: The mean value of functional status at admission was 59% of the maximum allowed by the SPIM scale (49/82). During the rehabilitation program the score improved by a maximum of 84% (41 points) and by 18.6% (9.07 points) on average. The improvement in function correlated positively with a length of stay in rehabilitation (LOS) of up to 60 days, and negatively with the admission SPIM score ($p < 0.001$). No significant correlation was found between SPIM gain and AIS grade, pain relief, use of narcotic drugs, and an open compensation claim.

Conclusions: The restoration program achieved a significant functional improvement in many of the most difficult CLBPD patients. Patients with initial severe disability improved more than those whose initial functional condition was higher, and additional stay in rehabilitation, of up to 60 days, resulted in further improvement. Pain relief or external factors that may influence pain or motivation did not affect the functional restoration. The Loewenstein inpatient CLBPD program is recommended for patients with LBP and a significant primary ADL deficit.

Key words: Low back pain disability, functional restoration, inpatient rehabilitation program

LOW BACK PAIN AND ABSENCE FROM WORK – CAUSE OR A CONSEQUENCE

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Introduction: Chronic low back pain (CLBP) is not just the same as acute back pain lasting longer, but the result of a complex interplay of physical, psychological and social factors. It is estimated that 60-70% of patients with LBP recover by 6 and 80-90% by 12 weeks. However, recovery after 12 weeks is slow and uncertain and it is followed by long lasting absence from work. After two years of absence from work, the return rate is close to 0. Aim of this study is to demonstrate the interdependence of chronic back pain and absence from work and to emphasize the importance of early return to work activities.

Materials and methods: Prospective study was conducted in our Clinic from October 2011 till January 2013. From 754 patients with low back pain, 180 had back pain that lasted longer than 12 weeks. 100 (46 female; 54 male) were active and did not stop working before and throughout the therapy. 80 patients (42 female, 38 male) were absent from work (68 unemployed: 24 never worked, 34 lost a job in past three years, 10 without job for longer than 3 years; 8 on a seek leave and 5 retired). Patients had individually designed and conducted exercise program. Results were gathered using SF-36, VAS pain, Oswestry Disability Questionnaire, Fear Avoidance Questionnaire, Tampa Scale of Kinesiophobia and Beck's Depression Inventory.

Results: Before and after the therapy results were significantly better in patients that stayed active all the time. Pain was reduced and functional performance increased significantly: VAS before the therapy = 8.01 ± 2.11 ; after = 4.58 ± 1.27 ; ODS before the therapy = 35.28 ± 7.56 ; after = 23.44 ± 8.89 ($p < 0,001$). Also, BDI scores were much lower in this group. The situation was different in the group of patients who were not working during the active physical treatment: VAS before the therapy = 8.12 ± 1.14 ; after = 7.13 ± 1.70 ; ODS before the therapy = 37.10 ± 12.01 ; after = 32.83 ± 11.24 ($p < 0,001$).

We must stress out that people who were unemployed had higher incidence of comorbidity (neck pain: 49 patients, hip pain: 19; high blood pressure: 27, verified depression 15). Majority of those who lost their job in past three years (27 /34) stated that they never had back pain while they were working, and 16 of them had more than three visits to the doctor because of their back pain during last year.

Conclusions: Better therapy results and absence of co-morbidity and depressive feelings in a group of patients who were not on a seek leave that lasted longer than few days, once again proved us that we must encourage our CLBP patients to return to work as soon as possible, and also to treat those unemployed with some severe cognitive-behavioural therapy to minimize depressive feelings and avoidance behaviours.

Key words: low back pain, absence from work, exercise

USE OF ICF IN DESCRIPTION OF CAREGIVERS ADAPTATION AFTER SEVERE BRAIN INJURY

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Introduction: After discharge from rehabilitative center, families become the “hub of care” for patients with a severe brain injury. Despite this, a description of single problems of families still remains unclear in the literature; The International Classification of Functioning, Disability and Health (ICF) can describe spectrum of problems relating to assistance, help health professional and social policies to highlight and report these problems in comparable and measurable data.

Materials and methods: We conducted a retrospective study on families of patients with SBI, discharged from our rehabilitation unit between October 2009 and June 2011. A specific questionnaire has been administered with a semi-structured telephone interview to the relatives of discharged patients. The answers were translated in ICF categories and we analyzed codes involved in changes more frequently. Correlations between ICF codes and variables of patients and relatives were calculated with Chi Square test and Mann Whitney test.

Results: We included 26 patients with a severe brain injury (12 with vascular etiology, 8 anoxic and 6 traumatic), mean age 56 years (SD of 18.52yy), 16 males and 10 females. At the time of discharge 19 patients came back home. The questionnaire showed that: 11 relatives (57,89%) have changed home or made structural home modifies (d610); 17 (89,47%) had reduced time for hobbies or recreational activities (d920); 7 (36,84%) had changed or modified type of work (d845); 10 (52,63%) experienced a lack of relationship with friends (e320); 16 (84,21%) assumed persons for patient or home care (e340); 17(89,47%) had professional health care at home. Patient's age, number of caregivers and length of stay in rehabilitative center correlate with variations in several ICF categories.

Conclusions: The loss of social network, the reduction in recreational activities and in friendship relations or changes in employment is common problem among families after discharge of a patient with SBI. Furthermore, relatives experience financial difficulties related to needs for long term home care. Our data suggest that number of caregivers and age of patients should be considered to giving information to relatives and community services about planning discharge at home.

Key words: ICF, caregivers, severe brain injury, home setting

THE HOSPITAL INFORMATION SYSTEM IASISNET

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Introduction: 2 years ago Data Design SA, a Greek company specialized in Medical Informatics, undertook a project to develop an information system capable to support all the activities into a new Rehabilitation Center in Thessaloniki, EUROMEDICA Arogi SA.

We will examine how a Hospital Information System (HIS) is involved in all medical and non medical procedures in rehabilitation.

Materials and methods: After over 2 years of uninterrupted operation, it is produced a huge capacity of materials, data and statistics for about 3450 patients. The program is the specific HIS, called IASISNet. Beyond the data, we collected many evidences such as pictures of pressures sores, treatments and surgery wounds. Access to this program have all staff members such as nurses, physicians, therapists, physiatrist. All procedures are recorded from initial assement of nurses, medical doctors and therapists, to the notes of the team meeting.. “Medical memos”, “directions” and “Functional Independence Measurement (FIM)” are only some of the innovative elements of IASISNet, which are combined with the classical medical treatment in order to achieve the highest results to the rehabilitation procedures.

Results: At the moment we have full data from 3450 patients with initial assessments, team meetings medications, vital signs, laboratory results are all in the program. Also photos of wounds, surgery trauma, and medical procedures (acupuncture, intraarticular injection etc) are all available. The information system stores all data needed for retrospective studies. The program also organizes the timetable of the therapists and nurses. Each patient has his weekly therapeutic schedule printed out from the system. Even in case of cancellation of the therapy, is evident to the system the reason for it.

Conclusions: The example of rehabilitation center EUROMEDICA AROGI, which accommodates about 220 internal patients and up to 300 out-patients daily, can easily describe a success story of the functionality of an HIS in the complicated and demanding environment of a rehabilitation center. All these capabilities of IASISNet create a complex net of information which in the right hands consist a unique tool for the medical staff of an institution, helping in organizing with surgical accuracy the entire patient therapy, simplifying all process and achieving the best results rapidly.

Key words: Rehabilitation Information system, data collection

**FUNCTIONING AND DISABILITY IN AMYOTROPHIC LATERAL SCLEROSIS
REHABILITATIVE PROJECT: ROLE OF ICF CLASSIFICATION**

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Introduction: The purpose of this study is to highlight the functional effects that Amyotrophic Lateral Sclerosis (ALS) has on the functioning of patients and to identify the most critical areas of rehabilitation, using the ICF (International Classification of Functioning, Disability and Health). **Materials and methods:** We recruited patients resident in Umbria, Italy, with a diagnosis of ALS who was monitored from March to September 2011. To assess the functioning of patients we used 19 ICF items taken from the questionnaire WHO DAS 2 2000, assigning a score from 0-4 for ability and performance, when these were completed a statistical analysis of the collected data was carried out.

Results: We recruited 20 patients with ALS (12 males and 8 females), with a median age of 65 years (range 42-80 years) with different ALS forms at various stages of the disease. The mean multidisciplinary follow up time was 1291.75 days (range 60-5170). The disability areas were: "Remunerative employment" and "doing housework" (median score 4), "dressing" and "washing" (median score 4). The items performance using facilitators were: "wash"(100%), "dress"(100%), "sit down"(80%), "move around the house"(70%), "eating"(60%), "move to different locations"(60%), while performance was essentially unchanged in the items: "paid employment"(5%), "economic life"(5%), "managing tension"(10%), "life in the community"(25%), "doing housework"(25%).

Conclusions: The facilitators make a difference in the areas of movement and personal care while performance is lower in daily activities and social life. The ICF can highlight the critical issues which will need more attention with a targeted rehabilitation project.

Key words: ICF, Amyotrophic lateral sclerosis, rehabilitative project

COMORBIDITY IN SUBJECTS WITH LONG-STANDING SPINAL CORD INJURY

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Introduction: There have been substantial improvements in survival after spinal cord injury (SCI) in the last several decades. As medical care advances provide great contribution to increase life expectancy of people with SCI, research focus on aging and long-term consequences that impact their lives. Subjects with chronic SCI often experience complications and problems related to their disability. The aim of this observational study is to explore the prevalence of comorbid conditions among subjects with long-standing SCI and to find out prevention strategies.

Materials and methods: The study population included 50 subjects with paraplegia or tetraplegia of more than 25 years duration from the Centre for Paraplegics in Ostia Lido outpatient department observation.

Results: 50 subjects (3 women, 47 men), mean age was 61.78 years (range 50-81) and year since injury was 28.56 years (range 25-51). Prevalence of comorbidity was: hypertension 44%, renal cysts 30%, lithiasis 34%, traumatic bone fracture 16.5%, spinal deformities 28%, pressure ulcer 74%, diabetes 20%, carpal tunnel syndrome 10%, rotator cuff lesion 10%, HCV positive 10%. We observed less comorbidity between subjects practicing sport at high level, it was 14%.

Conclusions: As shown in these results, prevalence of comorbidity in subjects with chronic SCI is high. Authors underline the need to improve knowledge on this topic to provide a comprehensive approach to long term follow-up, focusing on disease prevention and emphasizing the crucial role of caregiver's competence who also age with aging SCI becoming less able to provide care.

Key words: aging, SCI, comorbidity, sport practice, caregivers

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GENERAL PRINCIPLES OF EXERCISE PRESCRIPTION

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Introduction: The physical activity has multiple benefits, regardless of age, sex, state of health. Physical activity in children promotes socialization among pairs, educates healthy lifestyles and promotes the gain of physical skills. In adulthood it promotes the maintenance of health and prevention of various diseases. In the elderly promotes the maintenance of independence and is in the 1st line of approach to numerous pathologies.

Materials and methods: PubMed search through the Mesh terms, using the key words “physical activity”, “health status”, “exercise prescription”.

Results: There is clinical evidence of an inverse relationship between physical activity and cardiovascular disease, osteoporosis, diabetes, obesity, cancer, anxiety, depression. Physical activity is recommended as first-line approach in the prevention of various diseases, as well as the first - line therapy of multiple comorbidities. A training program will be more successful if it is prescribed taking into account the person as a bio-psycho-social one.

Conclusions: Exercise prescription expected to become increasingly individualized and appropriate to the aims pursued and existing comorbidities. A method of prescribing physical activity obeys the method FITT (F - frequency, I - intensity, T - time, T - type modality).

Key words: “physical activity”, “health status”, “exercise prescription”

THE FORCE FEEDBACK INSTRUMENT: A TOOL FOR THE ASSESSMENT OF THE EFFICACY OF THE MULTI-PAD ELECTRODE ELECTRICAL STIMULATION AND FEEDBACK FOR CLOSED LOOP CONTROL

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Introduction: Functional Electrical Therapy (FET) is the technique which assists intensive exercise during post-stroke recovery. The repetition of natural-like movements, typical for daily activities has been reported to improve the recovery of patients. In addition, providing longer functional therapy sessions enables faster functional improvement of impaired limbs. The major difficulty in the implementation of the FET comes from the insufficient selectivity of functional electrical stimulation for generating movement, fast occurrence of muscle fatigue, and inadequate control paradigm. For overcoming these obstacles we designed stimulation system based on multi-pad electrodes which, as reported in our recent publications, produces selective and fatigue resistant stimulation. In order to assess the efficacy of the new system in the grasping tasks, we designed an apparatus for grip strength measurement in form of a standard bottle. The same device can be used for feedback control (control of the elicited muscle force) during functional tasks.

Materials and methods: Electrical stimulation was done using INTFES ver. 1 system comprising multi-pad electrodes and stimulator which controls both, electrode pad activation and corresponding stimulation parameters. Optimal electrode configuration (active pads and current pulse parameters) for the palmar grasp is defined in electrode calibration protocol described elsewhere. The new apparatus for grip strength measurement, in form of 0,5 l bottle, was employed as object for manipulation and feedback device. Measurements were conducted in healthy subjects with the same sensorized bottle and used later as the reference of a force in patients. The feedback is used to minimize the force; yet, keep at the level which guarantees the firm and stable grasp. In this way, we can generate the grasp while avoid fast occurrence of muscle fatigue due the reduced stimulation intensity and slower saturation of the muscle reserves.

Results: Our results present range of forces that healthy subjects produced while manipulating with 0,5 l bottle. Stimulation protocol achieved to find pads for stimulating palmar grasp. By modifying stimulation amplitude, we can set desired grip force in range of those recorded on healthy individuals. When comparing forces elicited in open loop stimulation and target forces, which can be produced with sensory feedback, decrease of 24% in generated force can be achieved, thus, delaying occurrence of fatigue and prolonging FET sessions.

Conclusions: Our methodology was designed with intention to produce optimal palmar grasp for prolonged FET sessions. Measurements on healthy subjects provided us baseline data needed for optimizing grip force on hemiplegic patients using electrical stimulation. The new bottle alike sensor is a very functional accessory that can be used during the setup of electrical stimulation, in our case integral part of the stimulation system based on multi-pad electrodes.

Key words: grasping force, electrical stimulation, selectivity, muscle fatigue

OPTIMIZATION OF ACTIVE PADS ON A MULTIPAD ELECTRODE FOR SELECTIVE FINGER MOVEMENTS BASED ON ACCELEROMETER DATA

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Introduction: Functional electrical therapy (FET) integrates intensive exercise, functional electrical stimulation and motivation to relearn object manipulation and grasping that are missing as a consequence of central nervous system (CNS) injury. Results suggest that FET has favorable carry over effects on rehabilitation of upper extremities and thereby it is a valuable therapeutic method. Previous studies showed that the system based on new intelligent array electrodes and asynchronous stimulation allows selective and low fatiguing activation of paralyzed muscles. Aim of this study is to find a method that would allow fast selection of active pads on multipad electrode in order to produce selective finger movements and natural like grasping.

Materials and methods: Five healthy volunteers participated in this study (Age 27±3). One of two multipad electrodes was placed on volar and other one on dorsal side of the forearm, 5 cm below the elbow and 1 cm apart from the line connecting medial epicondyle and ulnar styloid process. For stimulation we used INTFES stimulator (Tecnalia, Spain) and irregular 4x4 matrix electrode that was designed in respect to nerve and muscle layout on the forearm of hemiplegic patients. Stimulation frequency was set to 30Hz and the pulse width was set to 250µs. Range of currents for the optimization process was selected manually, and every pad of the array electrodes was activated with 1mA increment of amplitudes in the predefined range. Amplitude ranges used in this study were 12±2mA for flexion and 14±2mA for extension. Four accelerometers were placed on fingertips of the thumb, index, middle and ring finger in order to measure the movements produced by stimulation and one accelerometer was placed on the dorsal side of the palm in order to measure the wrist movements. For all stimulation positions (16 pads for flexion and 16 for extension) we calculated maximal produced movement and sorted them in descending order. Finally, active pad patterns for grasp generation were determined based on Teager energy of the predicted summary movement when several pads are being activated. Combinations of active pads were made with minimum 2 and maximum 4 pads for each finger and the wrist movements were minimized in order to produce selective finger flexion/extension. In this process, adequate currents intensities for stimulation are also identified.

Results: The selectivity of stimulation was inspected visually, firstly by testing the stimulation response of the separate fingers and latter by applying stimulation patterns for grasp generation. Three types of grasps were tested: palmar, lateral and pinch. Duration of extension and flexion of individual fingers and the wrist in the grasping sequences was set in respect the literature. The presented active pad optimization protocol resulted with the proper muscle activation and functional grasp in more than 90% of trials. Grasps were not completely functional only in the cases when movement of some finger could not be produced by stimulation of any pad due to the inadequate electrode coverage of the forearm (in cases of too large or too small arms).

Conclusions: With the electrode design presented in this study we were able to produce selective movements for each finger and wrist and the pad optimization protocol was able to calculate adequate active pad patterns for natural like grasps. The time needed for the optimization protocol and the pad selection is less than 2 min and the grasping stimulation can start immediately after this stage is finished. The results of this study need to be verified in clinical environment in patients with CNS injury whose reaching and grasping abilities are limited.

Key words: Functional electrical stimulation, multipad electrodes, isolated movement, grasping

GAIT OUTCOMES OF SPASTIC EQUINUS FOOT COMBINED SURGICAL AND PM&R TREATMENT

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Introduction: Spasticity is one of the most prevalent sequels of upper motor neuron syndrome and the most disabling. Gait is the functional activity most frequently performed by humans throughout life, therefore, of utmost importance for their autonomy and quality of life. In patients with spasticity of different aetiologies, gait is impaired. In adults, the most common deformity of the lower limb is the equinus foot (EF), and the success of gait rehabilitation depends largely on its treatment or compensation. Gait analysis is useful both to detail the aims of surgery and give information to the surgeon that may help deciding the surgical procedures.

The goal of this paper was to present a series of patients with spastic EF (included in an observational on-going study), intending to demonstrate the outcomes of treatment, combining multimodal rehabilitation with different techniques and resources of PM&R and neuro-orthopedic surgery. Other objectives were: to evaluate gait velocity, the kinematic behavior of dorsi-plantar flexion of the ankle joint and dynamic behavior of the vertical component of the ground reaction forces (GRF).

Materials and methods: We conducted an observational, descriptive and retrospective study in eight cases of patients with spastic EF evaluated with gait analysis, before and after the combined multimodal treatment described above. We selected patients whose pre and post-operative records were complete, according to the gait laboratory routine protocol. They were 8 patients with spastic hemiparesis due to cerebral injury and spastic EF (5 males and 3 females). Etiologies were: 5 cases post-TBI and 3 cases post-stroke.

We tried to find a relation between gait velocity and: 1) the angle of ankle dorsiflexion during the single support phase of the affected limb; 2) the magnitude and inclination of the first peak of the vertical component of GRF (Fz) of the affected limb.

Results: There was a mean increase in velocity of 0.067 m/s (gait efficacy), concomitant with a reduction of the angle of equinus in single support (average of 14°); an increase of maximum value of GRF Fz measured as a percentage of body weight during load acceptance of the stance phase (average 10.7%); a slight decrease in duration of the load acceptance in the affected limb (average 1.4%).

Conclusions: Chronic stroke patients presenting with a spastic EF deformity can benefit from several therapeutic interventions. The gait laboratory was fundamental for pre-operative guidance and for the interpretation of the outcomes obtained with the combined treatment of PM&R and neuro-orthopedic surgery, as well as to explain the biomechanics of interdependent underlying mechanisms. This study is on-going, aiming to learn more and more about the most suitable options for treating stroke patients with EF.

Key words: Equinus foot, stroke, gait analysis, multimodal treatment, surgery

COMPUTER VISION SYSTEM FOR ASSESSMENT OF HAND MANIPULATION

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Introduction: The recovery of the functional use of upper limbs in patients after stroke is very important goal of rehabilitation requiring continuous follow-up of functional improvement. The most common method used to determine functional ability of the paretic upper limb - Wolf Test Motor Function- is not only subjective, it is a time demanding for both, the patient and the therapist. While patient performs a number of particular tasks, a therapist measures time and scores task performance. On the other hand, objective tests for assessment of the arm manipulation in patient are mostly limited to movements in the transverse plane, while stroke patients often have more difficulties moving the arm against the gravity. Further, these tests require setting up and calibrating sensors for each patient which is complex and time consuming. We propose a novel method based on the Kinect sensor and an algorithm that tracks the real world coordinates of the hand. This objective and simple approach (no attached sensors) may be used for evaluation, analysis and classification of upper-limb motor condition for any movement in patient's reachable space.

Materials and methods: Procedure that we developed enables tracking and estimation of hand position in real world from the Microsoft Kinect depth image stream. It is based on the computer vision and image processing algorithms that results with 3D coordinates of the hand position with time resolution of 15fps and estimation error that is less than 1cm. Ten young healthy subjects (6 female, 4 male) participated in the experiment. The task was to "draw" a circle with 10cm radius and a 10x20cm rectangle in frontal plane in outward and inward directions starting from the midpoint in the bottom of the figure. They were asked to perform movements in their own pace as precise as they could five times, with the right, then with the left hand, alternatively. The subjects had a visual feedback on a PC screen about their hand position in respect to the desired trajectory. The recorded movements were evaluated based on the distance from the hand reference point to the nearest point of the desired trajectory. For movement effectiveness criteria we adopted *Hand Coordination Parameter* (HCP) – a new measure which we defined as a sum of distances (90%) and standard deviation (10%), and calculated for each trial. HCP informs both the movement precision and the dexterity of arm.

Results: Results of the experiment on healthy subjects indicate that methodology based on computer vision for hand tracking and HCP can be used as an objective measure of movement performance. Our results show that this algorithm can distinguish between dominant and non-dominant hand for 80% of subjects when drawing a circle. This distinction was not so apparent in rectangle drawings, although the ranking of subjects in respect to their hand manipulation was still possible. Based on these findings, we can presume that presented approach may be adjusted for clinical applications in evaluation of hand manipulation.

Conclusions: A novel method for assessment of hand manipulation during user defined movements in frontal plane based on Kinect sensor and computer vision algorithms is presented. Experiment on 10 healthy subjects resulted in similar values of the HCP for both circular and rectangular movements. These values can be used for assessment of the paretic arm functionality as a reference for a functional hand. Our goal is to set a scale that will score the stage of upper-limb impairment and correlate it with commonly used clinical scales for stroke patients. It is important to emphasize that presented methodology does not require sensor attachment and that can be applied for evaluation and analysis of any 3D movement.

Key words: Stroke, Microsoft Kinect, assessment, hand tracking, real-world coordinates

**THE ROLE OF POLYMYOGRAPIC ANALYSIS IN THE QUANTIFICATION OF RECOVERY
AFTER SENSORS DRIVEN FUNCTIONAL ELECTRICAL THERAPY IN STROKE
PATIENTS**

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Introduction: This study presents a polymyographic analysis of the of the activation patterns in the control of movement in stroke patients treated with sensor driven FET. The aim of the study is to quantify recovery that underlies clinical improvement after the FET treatment.

Materials and methods: The recordings were performed at the initiation of the rehabilitation treatment and after it were completed. We asked subjects to perform dorsiflexion, as a goal directed activity. Subjects were asked to track the target line shown on the screen by dorsiflexion the foot in the sitting position. The target line was created individually and automatically for each subject. The target line connected the resting ankle joint angle (0 degrees) and 90% of the maximum dorsiflexion angle. The achieved dorsiflexion angle and the target line were displayed on a monitor that faced the subject. The max value was determined by averaging the recordings from 10 subsequent trials, in which subjects were asked to generate maximum dorsiflexion.

Results: The tracking of the target dorsiflexion angle (maximum angle was 9 ± 6 degrees) was delayed compared with the tracking after the therapy where the maximum angles reached values of 18 ± 4 , which is almost 80% of the values characterizing healthy subjects. Patients before FET had low graduation of TA EMG, and in general low activation of TA in parallel with the high activation of RF which is completely opposite compared with the healthy subjects. Patients after FET had steeper graduation of TA EMG and reached higher activation of TA, in parallel with low activation of RF. This synergy is much closer to the one characteristic for healthy subjects.

Conclusions: This research implies that that the facilitation of walking by sensor driven electrical stimulation provided better conditions for the cortical changes to take place during the early phase of post-stroke recovery, as compared to walking only.

Key words: Stroke, FET, polymyography

PHYSICAL AND REHABILITATION MEDICINE IN CROATIA

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Introduction: Although Croatia is a small country on the Mediterranean Sea, it has a hundred-year-old tradition in rehabilitation medicine. First rehabilitation facilities in Croatia were thermal resorts, which were the foundation for development of a large number of specialized rehabilitation centers. Also, in 1947, Croatian Society of Physical Medicine, Rehabilitation, Rheumatology and Balneology was founded, in 1967, Croatian Society for Rheumatology spun off as an independent society and since 2005 the society operates under the name Croatian Society of Physical and Rehabilitation Medicine. Since then, Society directs development of physical and rehabilitation medicine in our country.

Materials and methods: Critical collection and study of data on present state of physical and rehabilitation medicine in Croatia.

Results: At the moment, there are 1900 rehabilitation beds in Croatia, which is a high ratio of 0.42 per 1000 inhabitant, considering that the minimum recommended standard is 0.10. Croatia has the second highest ratio of physical and rehabilitation medicine (PRM) specialists per 100000 inhabitants among European Union of Medical Specialists (UEMS) member countries. Croatian Society of PRM, under current presidency of Prof. Tonko Vlak has steady membership of approximately 250 members and Board of 13, including one vice president, treasurer and secretary. We have included Board members from all Croatian regions, to keep the link with local PRM communities. Communications to members are done by regular e mails and through our web site www.hdfrm.com. CSPRM has regular meetings with lectures, the general assembly is held every year, elections every fourth year, as well as national congress.

CSPRM owns and published its journal Fizikalna i Rehabilitacijska medicina since 1984. CSPRM is an active member to European Society of PRM. Croatian Medical Association was accepted in UEMS in 1996 and in 1997 our representative joined UEMS PRM Section and Board.

Conclusions: Although some of these numbers are impressive, rehabilitation medicine in Croatia did not yet reach necessary standards. Rehabilitation medicine in Croatia needs to address many issues, such as increasing rehabilitation needs, abundance of PRM specialists and rehabilitation beds, as well as shortcomings in education, which is focused on rheumatology rather than rehabilitation. The existing traditional system of rehabilitation care can not satisfy the new standards set for quality and efficiency of rehabilitation medicine. Need for a change in Croatian educational and rehabilitation system was evident.

Key words: physical medicine, rehabilitation, Croatia

THE REHABILITATION IN JORDAN

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Jordan population around 6.5 millions, the disability form 5% of population, the main causes of disabilities are: trauma, diseases congenital, hereditary causes, beside eldary problems. For that the Jordan Government and local societies paid more attention to improve rehabilitation services and facilities for disabled persons. By national strategy for persons with disabilities by annulment of the welfare law for disabled persons, the development of the law on the rights of persons with disabilities and the creation of he higher council for affairs of persons with disabilities. For that the rehabilitation services have been developed in the last twenty years especially by the well trained physician as specialty fields of PRM under the umbrella of Jordan medical council. Also the paramedical staff in field of PT, OT, P.O, SPTH, under the umbrella of rehabilitation since college which belongs the Jordan universities to have Bachelor degree. Beside that Jordan developed rehabilitation services through medical rehabilitation centers at the big hospitals at middle north and south of Jordan and special department for SCI at military hospital. Also Jordan developed C.B.R at rural area

FUNCTIONAL CAPACITY EVALUATION IN PATIENTS WITH DIFFERENT FORMS OF MULTIPLE SCLEROSIS

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Introduction: Multiple sclerosis (MS) is a chronic progressive disease affecting young adults and leading to considerable disability in daily life. The common functional limitations and symptoms are associated with disorders of strength, sensations, coordination and balance as well as cognition, mood and vision disorders. The disease course is unpredictable and as result impairments and activity limitations can appear suddenly and progress over a time. The purpose of our study was to evaluate the functional capacity (FC) in MS patients with different forms of multiple sclerosis.

Material and Methods: We have evaluated 45 patients with diagnosed multiple MS that were referred to Clinical for Rehabilitation for treatment. Three forms were separately analyzed and patients were grouped into 3 groups: Group 1 included patients with relapse remitting form, Group 2 (N=15 patients) those with secondary progressive form and Group 3 included those with primary progressive form. For evaluation of functional capacity we analyzed further scales: EDSS scale, Ashworth scale, MSSS88 and Beck scales. The comparisons were made between different groups of patients within same scale.

Results: The most frequent form of MS in our study was primary progressive form with more than half participants (24 (53.3%) patients), while the least frequent was relapse remitting (6 (13.3%) patients). Secondary progressive form was noticed in 15 (33.3%) patients. There is significant difference in mean values for FC measured by EDSS between Group 1, Group 2 and Group 3 (EDSS: Group 1- 3.92 ± 0.67 ; Group 2- 5.27 ± 1.02 ; Group 3- 5.88 ± 1.14 , $p < 0.001$). Differences of mean values for FC measured by Ashworth scale ($p = 0.069$), MSSS88 ($p = 0.472$) and Beck ($p = 0.162$) scales were noticed as well but only significant difference persisted in FC measured by Ashworth scale between Group 1 to Group 3 (Ashworth: Group 1- 1.58 ± 0.49 ; Group 3- 2.46 ± 0.88 , $p = 0.027$).

Conclusion: Our results pointed out that most frequent form of MS is primary progressive. Further we have shown that changes in functional capacity measured by EDSS scale significantly varied between different forms of MS, same applies for functional capacity evaluation by Ashworth scale between relapse remitting and primary progressive forms.

Key words: multiple sclerosis, functional capacity, scales, adults

O – 037

Abstract No.: 13739170138152

SEXUAL ACTIVITY AFTER BRAIN INJURY – FEARS AND BELIEFS

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Introduction: This study aims to understand the beliefs and fears concerning sexuality in patients with brain injury (BI) admitted in a Rehabilitation Department (RD) and thus establish strategies for prevention, assessment and adequate intervention.

Materials and methods: We collected data for all patients admitted with a BI in a RD during December 2012, concerning demographic information. A questionnaire was made, with 18 questions to assess beliefs, fears and expectations of patients with sequelae of BI. Inclusion criteria: patients with BI and the ability to understand and respond to the survey. Exclusion criteria: patients not cooperating and / or confused, aphasia, previous sexual dysfunction. SPSS was used for descriptive and statistical analysis

Results: The sample consisted of 23 patients, 16 males, mean age 46 years. Diagnosis of admission: 13 patients with stroke and 10 with TBI. The majority of patients were sexually active before the injury, 26% think will never be able to have an active sex life again, 47.8% are much less interested in sex, 52.2% think physical changes prevent from having a fulfilling sex life, 34.8% don't have anyone else to discuss issues about sex and 30.4% stated would like to talk to someone about resuming sex. 87% denies feeling too old for sex, 73.9% denies fear of rejection and 68.2% denies feeling less attractive and his/her partner would not be interested in her/him. In general, patients manifest that if they wanted to talk to someone about their sex life they would prefer someone of the same sex. Of the stroke patients, 38.4% feared that sex would cause a another stroke. The youngsters have more fear than the elderly that physical changes would prevent them from having satisfying sex life.

Conclusions: We obtained a comprehensive understanding of the needs of our patients concerning sexuality. We hope to better target our efforts to meet their expectations / fears, minimizing restrictions on participation of a satisfying sex life.

Key words: brain injuries, traumatic; stroke; sexuality

O – 038

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DEGENERATIVE DISEASE: ROLE OF REHABILITATIVE TEAM WORK

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Introduction: Patients suffer from chronic neurological disease often received only medical treatment by neurologist and sometimes never consulted with rehabilitation medicine specialist.

Materials and methods: We present a young patient suffers from longstanding Parkinson disease and diabetes mellitus with severe Charcot foot deformities which cause functional decline. He was admitted to our rehabilitation center due to general deterioration after acute illness. He was bed ridden, unable to stand and walk, with severe resting tremor and rigidity. His feet had typical Charcot deformities. Neurologic and orthopedic rehabilitation team work reveal to dramatic improvement of general status, safety of patient gait and quality of life.

Results: We discuss about the role of rehabilitation approach to patients with chronic degenerative diseases, like Parkinson disease, multisystem atrophy, multiple sclerosis, Alzheimer disease and importance of motor and cognitive training along with strong drug administration in rehabilitation setting.

Conclusions: Accurate multidiscipline rehabilitation team treatment and follow up may cause stable functional status of patients suffer from degenerative disease and improved their quality of life.

Key words: degenerative disease, multidiscipline rehabilitation team

**MAJOR FACTORS THAT INFLUENCE LENGTH OF STAY AND FINAL OUTCOME IN
EUROMEDICA AROGI PATIENTS TWO AND A HALF YEARS EXPERIENCE**

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Introduction: Final outcome and length of stay are important factors in economics of rehabilitation. The medical condition and severity of diagnosis of the patient on admission, age, and gender are important to predict the final outcome and the length of stay. It is important for patient and family members to have an estimate of the duration of hospitalization and condition on discharge.

Materials and methods: We collected data from patients who were admitted in Euromedica Arogi Thessaloniki rehabilitation center from 01.01.2011 to 30.6.2013. The results of our rehabilitation program were evaluated using Functional Independent Measure (FIM). The whole population of patients for this time period consisted of 3.475 patients. Two hundred fifty four patients were excluded due to incomplete data. The patients' data were extracted from Euromedica Arogi database with the Med. Info System called "IASIS. NET". Patients data included gender, age, diagnose, FIM admission and FIM discharge. These data were processed in SPSS v. 16.1. Patients were divided in 8 categories 1= Amputation, 2=SCI, 3= Rheumatic and Pain 4 = TBI, 5= CVA, 6=Peripheral neuropathy 7= Orthopedic surgery, multiple fracture patient and sports injuries patients, and 8=Parkinson patients. This study concern the orthopedic surgery, CVAs TBIs and SCI patients (3031 patients)

Results: Of 3221 patients 1284 were males, and 1937 were females. The majority were orthopaedic surgery multiple fracture and sports injuries 2150, CVAs 724 TBIs 50, and SCI 107. The mean age of orthopaedic patients is $72,27 \pm 19,08$, CVAs $71,93 \pm 13,54$ TBI $52,46 \pm 24,6$ and SCI $54,75 \pm 21,5$. . The statistical analysis of the data shows that the age, LOS, Final FIM are statistically significant

Conclusions: Rehabilitation is a complex process which is influenced by the age of patient and the diagnosis. Our results show that the length of stay and the final outcome are proportional to the initial FIM of the patient.

Key words: Length of stay, Final Outcome, FIM rehabilitation process

O – 040

Abstract No.: 13702571116812

WHAT'S THE FUNCTIONAL IMPACT OF BOTULINUM TOXIN TYPE A TREATMENT FOR SPASTICITY IN A POPULATION OF STROKE - SURVIVOR INPATIENTS? – EFFECT MEASURED BY TOTAL AND MOTOR SUB-SCORES OF FIM

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Introduction and Objectives: A stroke is a landmark event, because it's largely associated with functional impairment, leading to loss of independence in activities of daily living (ADL) and loss in quality of life. Rehabilitation of these patients requires a comprehensive program, which can be supplemented by pharmacologic therapies like botulinum toxin type A (BTX-A), to improve spasticity, pain and/or joint range of motion. The Functional Independence Measure (FIM) is widely used to assess patient's functional status and the outcomes of a rehabilitation program. This instrument, applied at admission and discharge, includes two major subgroups of items, motor and cognitive, allowing a global and detailed view of functional abilities. This paper aims to analyse the impact of BTX-A in both total and motor FIM scores, by comparing the score changes achieved during the phase of inpatient rehabilitation in patients who were and weren't treated with the above mentioned substance.

Material and Methods: The authors collected data from clinical files of 159 stroke survivors, admitted to an Adults Rehabilitation Service, from January 2010 to December 2011. We analyzed and compared the changes of total and motor FIM scores achieved by 47 patients, who were treated with BTX-A with the total sample of 159 patients. Statistical analysis was performed using SPSS ®.

Results: The study included 159 patients, 42.1% were women. Average age was 59 years. Ischemic stroke was the etiology in 75.5% of cases. Paired samples t-test showed significance ($p < 0.001$) both in the change of average total FIM scores (from 63,12 to 87,65) and motor FIM sub-scores (from 42.86 to 63.10) in the study population ($n=159$). Application of Levene test showed no significant difference ($p > 0.05$) in the scores achieved by the sub-group treated with BTX-A ($n=47$).

Conclusions: These findings suggest that the comprehensive inpatient rehabilitation program produced significant gains in patients' functional status, measured by total scores and motor sub-scores of FIM. The fact that the sub-group treated with BTX-A achieved similar improvement in these scores, shows that the patient's selection criteria were adequate.

Keywords: stroke, rehabilitation, FIM, botulinum toxin type A

THE DEFICIENCY OF AN UNIFORM MEASUREMENT SYSTEM LEADS TO PRESENTATION OF UNEQUAL RESULTS FOR RECOVERY OF SHOULDER FUNCTIONS AFTER OBSTETRIC BRACHIAL PLEXUS INJURY

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Introduction: The recovery of shoulder functions after obstetric brachial plexus injury in the literature is presented in the range from 3% to 95%. One of the causes for the discrepancy in registered results is the difference in measurements in these studies.

The aim of our study is to show how different methods of measurement can reflect on the presentation of recovery level of the arm flexion after obstetric brachial plexus injury.

Materials and methods: The research included 54 children during the treatment of obstetric brachial plexus injury at the Institute of Physical Medicine and Rehabilitation "Dr. Miroslav Zotović" in Banja Luka. Recovery of arm flexion was monitored during first 6 months and evaluated in two ways: *the establishment of the movement against gravity (Gillbert Tassin scale); *the full amplitude of active movement. Control measurements were conducted every month.

Results: In the study group, there were 26 (48%) girls and 28 (52%) boys. The Erb - Duchene palsy was the most common, including 39 (72%) of examined children. The least number of examinees had Klumpke - Dejerine palsy - 2 children (4%) and 1 child (2%) had the symptoms of Klumpke - Dejerine palsy and Horner's syndrome. Right brachial plexus injury was found in 28 children (52%) and left brachial plexus injury in 26 (48%) patients. The application of Gilbert Tassin scale in the first month of life in examined children verified active movement in terms of flexion of the upper arm against gravity (M3) in 5 (9.3%) children. At the end of the six month period all 54 examinees (100%) had this mentioned movement. The full range of motion in terms of flexion of the upper arm in the first month of life was measured and verified in 3 (three) children. At the end of the six month period 35 children had the full range of motion. The recovery defined by full range of motion was 65%. In this study, the appearance of motion against gravity is intensive in the first 4 months of life and occurs equably during the first 6 months of life. After that period the changes are less significant. Recovery at six months of age varies in the range between 65% and 100%, depending on the definition of recovery and methods of measurement. The study shows the significance of the means of monitoring the recovery of arm function, the reliability of the results of recovery in the studies dealing with this problem. By definition of reliable scientists recovery is considered to be the establishment of the full range of motion in the analyzed arm segment. Most researchers reported recovery over 50%, which is consistent with the results of this study, if the recovery and the method of measurement are clearly defined for further studies. The presence of high percentage of full recovery (95%) is confusing for the medical specialists because in clinical practice the large number of children is objectively with residual sequelae and various degree of dysfunction. In these patients, there is improvement in the clinical assessment, but also certain degree of deficiency. Therefore it is necessary to generate the unique categorization of recovery and the unique parameters of measurement. The division of recovery in different categories in the literature shows variations from different authors.

Conclusions: This research demonstrates the necessity for the unique measurement and unique definition of recovery, which would be implemented in all researches dealing with this issue. Thereby the recovery results of the shoulder movement would be optimal and there would be no unacceptable differences in presentation of recovery in patients which now can be found in the literature and it wouldn't lead to confusion in patient's parents, who often have unjustified, unreasonable expectations based on too much different information.

Key words: obstetric brachial plexus injury, active movement

OUTCOMES OF PSYCHOMOTORIC FOLLOWING AMONG INFANTS WITH IDIOPATHIC HYPOTONIA

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Introduction: The term hypotonia is often used to describe children with reduced muscle tone. Principal manifestation of idiopathic hypotonia is diminished resistance to passive range of motion in joints, sparingly spontaneous motor movements and joint hyperextensiveness. Hypotonia may be caused by peripheral and central nervous system disorders and metabolic, neuromuscular and connective tissue disorders. In some cases, the underlying cause of hypotonia is unknown and is referred to as idiopathic hypotonia.

The purpose of this study was to show observed results of the psychomotor development among infants with idiopathic hypotonia.

Materials and methods: Conducting a retrospective clinical study, we followed psychomotor development of 20 children with idiopathic hypotonia without significant abnormalities of neuromuscular system, in which the differential diagnostic process has not determined a definitive cause of hypotonia. For the evaluation of the psychomotoric development we used the Munich functional developmental diagnostic, based on the description of age: crawling, sitting, walking, grasping, perception, speech development and social contacts development. The diagnosis was made by detailed patient history, Vojta's diagnostics based on postural reactions, along with clinical assessment and evaluation of resting postures in prone and supine (passive tone), muscle tone, deep tendon reflexes. To exclude neuromuscular etiology of the hypotonia patients were sent to additional diagnostic tests.

Results: Analysis of the data showed that a developing slowdown was greater in the motor than in mental part of psychomotoric spectrum: 87.5% of children established head control to 5th month of age. Crawling on average, was established in 15.5 month, sitting as an independent function in these children sets with an average of 13.3 months. Function of independent standing and walking in 39% of children were established between 14th and 17th months, 33% between 23th and 31th months of age. In terms of mental status 43.8% of children were developing mental functions in corresponding calendar age, with 37.5% in the broader framework of expectations. Lower section shows the slowdown of mental development: 6.3% had borderline or easier slowing of mental functions in relation to chronological age. 44.4% of these children are followed and after the age of 3 yrs. old because of postural insufficiency, various foot deformities (pes planovalgus, pes talovalgus, genu recurvata).

Conclusion: Children with idiopathic hypotonia normally pass the different stages of motor development but at a slower pace, intellectual development is normal.

Key words: Idiopathic hypotonia, psychomotor development, developmental disabilities

**TEN YEARS FOLLOW-UP OF THE CHILD WITH RASMUSSEN'S ENCEPHALITIS
(SY RASMUSSEN)**

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Rasmussen's encephalitis is the chronic focal encephalitis, with unknown etiology, characterized by frequent focal seizures. It generally occurs in children. In patients resistant to medication treatment, surgical treatment may make them seizure free.

The goal: To show the importance of the correct and timely diagnosis and adequately and continuously implemented physical therapy in children with this syndrome.

The method: The girl aged four years diagnosed with partial epilepsy and gait abnormality was referred to physical treatment specialist to examine her. She was delivered in term by cesarean section. Until three years of age she had normal psychomotor development. The kinesiotherapy was started and further investigation was continued. After second hospitalization and second MRI, she was diagnosed with Syndrome Rasmussen. From March 2003. till June 2013. continuous ambulatory kinesiotherapy was conducted at the Pediatric physical Treatment Ward of Health Center Kruševac, together with educating parents to do physical therapy at home.

The results: Regardless of continuous kinesiotherapy program and medication treatment in the period from 2003.-2006., motor deficit and intellectual impairment deepened (from the initial weakness of left lower extremity muscle strength to development of left sided spastic hemiparesis, walking difficulty mostly impossible without help and intellectual deterioration, IQ 63 with difficulty in communication). After first surgical intervention in 2006., the child was seizure free. Everyday medication and physical treatment was continued. A year later, in 2007. the girl started going to school (IQ 85). She had corrective orthotics for upper and lower extremity. Seizures occur again in May 2008. In 2013. the second surgical intervention was done (complete section). From June 2013. she walks without any help, she has active movements of shoulder and elbow joint on the left side and non functional hand. She has full extent of movement in all joint segmentations of left upper and lower extremity.

The conclusion: Functional capacity of a child with a syndrome depends of timely and adequately implemented physical treatment. In order to maintain achieved results, considering the nature of the disease, and with respect to growth aspect, besides medication treatment it is also necessary to continuously and adequately conduct physical treatment in children with Syndrome Rasmussen.

Key words: syndrome Rasmussen, physical treatment, seizure, surgical treatment

O – 044

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HALLIWICK CONCEPT IN THE TREATMENT OF CHILDREN WITH CEREBRAL PALSY (CP)

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Introduction: The significance of Halliwick concept in the multidisciplinary treatment of children with cerebral palsy (CP).

Methods: We monitored 11-year-old boy with CP (diskynetic type). Hydro physical therapy was applied through the Halliwick concept once a week within 18 months period. Gross motor function was measured through that period of time with GMS 66 test. The testing was done three times, in September 2011. - at the beginning of the hydro physical treatment, in September 2012. and in June 2013. The manual ability was assessed with MACS test. The ability of swallowing, verbal communication and social interaction was observed also during the period of time.

Results: GMF66 score in the period of September 2011 to September 2012 was increased from 68 to 70,99, with no changes in functional level. The rate and agility in activities of daily living was increased. The communication and participation in peer activities was improved. The speech, swallowing and control of salivation was enhanced by establishing the control of respiration.

Conclusion: The Halliwick concept has significant position in the improvement of functional skills of children with CP, increases motivation for participation and collaboration in the treatment and opens up the possibility for more significant participation in life environment.

Key words: Halliwick concept, cerebral palsy, improvement of functional skills

**THE ROLE OF PSYCHOMOTORIC STATUS ON REHABILITATION PROGRAM INCLUSION
IN CHILDREN WITH CONGENITAL HYDROCEPHALUS**

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Introduction: Congenital hydrocephalus (CH) presents abnormal accumulation of cerebrospinal fluid in endocranium due to the production, flow or absorption disturbances. Patients with CH could have various degrees of psychomotoric delays. Inclusion into rehabilitation program may prevent onset of complications that could alter normal development. Therefore, the purpose of this study was to evaluate the correlation between inclusion into early and continuous rehabilitation program due to the psychomotoric status in children that underwent surgical correction of hydrocephalus. **Material and Methods:** We have evaluated 52 children that were referred to University Children's Hospital for treatment of congenital hydrocephalus. The study included only operated patients. The further parameters were analyzed: psychomotoric status adjusted with patient's age, early rehabilitation and continuous rehabilitation. Two categories were analyzed: absence or presence in psychomotoric delay, inclusion and non-inclusion into early and continuous rehabilitation program. Also, we have evaluated the proportion of patients that were included into early rehabilitation program who continued continuous rehabilitation.

Results: There were 34 (65.4%) patients with delay in psychomotoric development (PD) and 18 (34.6%) patient with normal PD. Only 3 (8.8%) patients with delay in PD were not included into early rehabilitation program, while entire group with normal PD underwent early rehabilitation program. Early rehabilitation was significantly frequently implemented (49:3, $p < 0.05$) in children with operated CH. For the group with delay in PD, more than $\frac{3}{4}$ of patients (79.4%) were included into continuous rehabilitation, while for those with normal PD, only 1 (5.6%) patient was included into continuous rehabilitation. There is no statistical significance (28:24, $p > 0.05$) between frequencies for inclusion and non-inclusion into continuous rehabilitation program. More than half of participants (N=27; 55.1%) that were included into early rehabilitation continued continuous rehabilitation program, while less than half (N=1; 33.3%) of those without early rehabilitation demanded necessity for inclusion into continuous rehabilitation program, stressing out significant correlation between inclusion into early rehabilitation program and further necessity for continuous rehabilitation ($p < 0.05$).

Conclusion: Our results stressed out that psychomotoric status in children with CH plays significant role in rehabilitation program (early and continuous) planning. Further, we have shown that there is significant correlation between inclusion into early rehabilitation program and necessity for continuous rehabilitation.

Key words: congenital hydrocephalus, psychomotoric development, rehabilitation, children

EFFECTIVENESS OF PHYSICAL THERAPY ON PAIN AND FUNCTIONAL STATUS IN RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid arthritis is a chronic, progressive, systemic, inflammatory disease characterized by synovitis, joint pains, morning stiffness and function damage, all of which leads to general and working disability. Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage.

Aim of the study is to examine the intensity of pain and functional status in patients with RA at the beginning and after completion of physical therapy and the frequency and type of painful sensations.

Methods and materials: The study was conducted on 56 patients aged 27-71, diagnosed with rheumatoid arthritis who performed physical therapy in a special hospital for medical rehabilitation for a period of 21 days. There were 35 female patients (62%) with a mean age of 53.33 ± 2.45 years and 21 male respondents (38%) with a mean age of 59.09 ± 2.11 years. The mean age of the sample group was 55.12 ± 3.41 years. Physical therapy consisted of physical training, hydrogymnastics, electroprocedures, massage, curative mud, and occupational therapy. Drug therapy did not change. The assessment of the severity of pain as well as the assessment of types of experienced pain was conducted at the beginning and at the end of the 21-day physical therapy. Respondents rated the intensity of pain by visual pain scale (VAS), and evaluated the type of experienced pain on the modified version of the McGill questionnaire. Functional status was investigated with Health Assessment Questionnaire (HAQ). The results were analyzed by statistical methods in accordance with the SPSS PC-program.

Results: The average duration of disease was 12 ± 1.42 years. Functional ability before treatment was HAQ = 1.99 and 1.78 after treatment. There was no statistically significant difference in functional status ($p = 0.733$), although the absolute values shift towards better functionality. 96.79% of respondents claimed to have had a painful experience, and the assessment of pain averaged 6.67 ± 2.54 on VAS scale. After completion of physical therapy the assessed pain averaged 4.87 ± 68.32 . The difference in the intensity of pain experienced at first examination and after physical therapy was statistically significant ($p = 0.021$) in reducing pain. There was no statistically significant difference in the perception of pain intensity based on gender. The most common sites of pain include: joints of the hands and wrists (86%), knee (60%), the joints in the foot and toe joints (52%), shoulder (39%), cervical spine (33%), elbows (20%), hips (7%). The experienced pain was estimated as: exhausting (86%), tiring (95%), sharp (65%), annoying (83%), hard (76%).

Conclusion: In the observed group of patients there was a statistically significant difference in reduction of pain intensity after conducted physical therapy. There was no statistically significant difference in functional status before and after treatment.

Keywords: rheumatoid arthritis, pain, functional status, physical therapy

O – 047

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**BODY MASS INDEX AS A RISK FACTOR FOR THE DEVELOPEMENT OF
OSTEOPOROSIS**

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Introduction: Osteoporosis is caused by a complex interaction of genetic, hormonal, metabolic, and other factors. One of the important places in the pathogenesis of postmenopausal osteoporosis occupies level of nutrition and body mass index.

The aim of this study is to show the degree of correlation between body mass index (BMI) and bone mineral density (BMD) as a risk factor for osteoporosis in postmenopausal women where menstrual history was normal.

Materials and methods: We worked out a cross sectional study, in which involved 228 postmenopausal women, who underwent central bone mineral density (BMD DXA) on the device Osteosys, at Institute for Rehabilitation, and measured body mass index (BMI). The results were interpreted according to the current definition of osteoporosis, and the data analyzed in the statistical program SPSS 14.0 for Windows.

Results: Out of 228 postmenopausal women, 77 had normal body weight with an average body mass index (BMI) of 22.21 kg/m², average age 61, while the average T score at the spine and hip was at the level of osteopenia. Same score (at the level of osteopenia) was measured in 151 patients with an average body mass index 29.38 (obesity), average age 65. From the total sample of 228 patients, 75 had the mineral bone density at the level of osteoporosis, an average body mass index (BMI) of 25.75, which corresponds to obesity. Results of the study indicate that there was no statistically significant correlation between body mass index (BMI) and bone mineral density (BMD DXA).

Conclusions: Body mass index (BMI) shows the relationship between weight and height of the body, however, does not take into account body composition, and its use is limited. It can not illustrate the percentage of body fat compared to muscle or bone mass, which are important criteria for assessing the risk of osteoporosis, and therefore could not be classified in the group of clinically important factors for development of osteoporosis.

Key words: body mass index, bone mineral density, osteoporosis

O – 048

Abstract No.: 13725272663676

**SPECIFIC QUESTIONNAIRES IN REHABILITATION OF PATIENTS AFTER
ALOARTHROPLASTY OF BOTH KNEES**

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Introduction: Specific questionnaires are developed for specific disease or condition and are focused on health related quality of life. They are not comparable with other disorders and are more sensitive to changes. Most frequently used questionnaires for patients with degenerative hip and knee disorders and after hip and knee arthroplasty are Western Ontario and McMaster Universitas Osteoarthritis Index (WOMAC) and Oxford score for hip and knee.

Objective: To show results of specific questionnaires (Western Ontario and McMaster Universitas Osteoarthritis Index (WOMAC) and Oxford score) and their significance in rehabilitation of patients with implanted total endoprosthesis of both knees.

Methods: Prospective study included 30 patients (5M, 25Ž) with aloarthroplasty of both knees rehabilitated in Rehabilitation centre „dr Miroslav Zotović“, Banjaluka, RS, in time period 2011-2013. Main measures were: gender, age, profession, range of motion (F/E) of knees, Western Ontario and McMaster Universitas Osteoarthritis Index (WOMAC) and Oxford score. Outcomes were assessed before and after rehabilitation. For statistical analysis of data we used T-test for paired samples.

Results: We found statistically significant improvement for the scores of both specific questionnaires (Western Ontario and McMaster Universitas Osteoarthritis Index (WOMAC) and Oxford score. The questionnaires were easy to use, patients understood them with ease, and they were independent in answering questions. Use of these questionnaires is helpful for quick assessment of functional status of patients as well as for evaluation of used therapy methods.

Conclusions: Specific questionnaires are being used in everyday clinical practice to monitor disease progression and for evaluating the effects of medical interventions- physical therapy. They give us a good insight in patient's functional status and contribute in gathering information along with other diagnostic and therapeutic procedures.

Key words: Oxford, WOMAC, rehabilitation, aloarthroplasty of the knee

O – 049

Abstract No.: 13693088248230

TEAM APPROACH IN PROSTHETIC REHABILITATION AFTER LOWER LIMB AMPUTEE

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Introduction: Institute for Physical Medicine and Rehabilitation "Dr Miroslav Zotović" has over 70 years experience in prosthetic rehabilitation. Great experience and a desire for better results in prosthetic rehabilitation led to the establishment of the rehabilitation team.

Objective: To describe the team approach in prosthetic rehabilitation at the Institute "Dr Miroslav Zotović", selection of patients for prosthetic and rehabilitation and the roles of all team members for the prosthesis (physiatrist, internist - cardiologist, psychologist, social worker, physiotherapist and occupational therapist, nurse, prosthodontist, patient).

Materials and Methods: This prospective study included 364 patients over a period of three years (2010 - 2012) undergone primary prosthetic rehabilitation of the Institute "Dr Miroslav Zotović." All patients were analyzed according to gender, age, level of amputation, etiology, and non prosthetic prosthesis. For the evaluation of the therapy was used Stanmoore Wood-scale mobility.

Results: In period of three years (2010 - 2012) prosthesis were applied on 364 patients, on 57 patients we did not applied prosthesis. Etiologically diabetes dominated in 69% of cases in 2010. and 63% of cases in 2011. and 2012. The average age stood at 63 years in 2010. and 65 years in the 2011. and 2012.

Conclusion: Co-operation of all members of prosthetic team is essential for a favorable outcome of the therapy. Teamwork is the only and best possible cooperation and communication of doctors, therapists, prosthetists, the patient and his family.

Key words: protetic rehabilitation, ambutation team work

O – 050

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BONE MINERAL DENSITY IN MEN WITH CRURIS FRACTURE

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Introduction: Osteoporosis is one of the most common diseases, nowadays. Osteoporosis in men, although of significantly lower frequency, in comparison to women, is not only a growing health but also a socioeconomic problem.

Objective: The objective of this written paper is to establish bone mineral density in men upto 50 years of age who had cruris fracture.

Methods 66 male patients were examined. Out of them, 46 were in the investigated group (IG), they were the patients who had cruris fracture, while 20 of them were without the fracture and they were in the control group (CG). Differences in the average of patients in both I and K group were not significant according to the age, so the groups werw comparable. Measuring of bone mineral density was performed on the DXA Hologic apparatus, on both lumbar vertebra L1-L4 and on the left hip.

Results: Average BMD value on the lumbar spine in the investigated group was $0,865 \pm 0,11 \text{ g/cm}^2$ (Z-scor $-1,9 \pm 0,88$), and on the hip $0,804 \pm 0,112 \text{ g/cm}^2$ (Z-scor $-2,0 \pm 0,83$). Average BMD value on the lumbar spine in the control group was $0,998 \pm 0,122 \text{ g/cm}^2$ (Z-scor $-1,14 \pm 0,91$) and on the hip it was $0,941 \pm 0,143 \text{ g/cm}^2$ (Z-scor $-1,39 \pm 0,83$). Statistically significant difference was not found between absolute values of BMD as on the lumbar spine ($p > 0,01$), as on the hip ($p > 0,5$), between the investigated and control group. There is no statistically significant difference between average Z-score values on the lumbar spine or on the hip in the investigated and control group.

Conclusion: It was not found that there significant influence of bone mineral densitu to the incidence of fractures.

Key words: Bone mineral density, men, cruris fracture

FACTORS INFLUENCING FUNCTIONAL CAPACITY OF AMPUTATION STUMP

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Introduction and objective: Amputation is a surgical procedure by which a part or an entire limb is removed. Infections and bleeding were the main problem in the initial stage of amputations. Development of surgery over centuries, introduction of anesthesia and implementation of anti-sepsis measures have led to a new era in surgery and amputation techniques. Therefore, a much better formation of the amputation stump is achieved. By the introduction of early rehabilitation, prevention of the occurrence of post-amputation sequelae and implementation of the most up-to-date prosthetic components, we achieve better success in prosthetic rehabilitation.

The objective of the study is to achieve maximum physical, psychosocial and professional capabilities of amputees and their reintegration into society, with an emphasis on the improvement of the quality of life.

Methodology: The degree of complexity of the planned research mandates the application of the methodology of clinical experiment, epidemiological method and numerical logic. The defined investigated sample is divided into three subgroups of patients: vascular, trauma and victims of anti-personal mines. The size of the samples enables making proper conclusions regarding each of the three mentioned groups, with the observation of 20 patients in each group. Statistical parameters used in the data analysis related to the relation of a part to the whole, the average value, variation interval, standard deviation, variation coefficient, standard error in the estimated average value, probability confidence interval of $p = 0.95$, t-test, X2 test and Fisher's test and the Mann Whitney U test.

Study results: The study was conducted in three groups of patients with different etiological cause of amputation. Patients were male. There was no statistically significant difference between the material conditions, $p > 0.05$. Apparent is significant difference in MANN WHITHNEY U TEST, which related to the duration of the surgical treatment in days, between the three groups of patients, $p < 0.001$, or the time elapsed from surgery to the beginning of rehabilitation. There is also evident statistical significance of differences with regard to the time of pre-prosthetic preparation among the three groups of patients, $p < 0.01$. Factors affecting the amputation stump and the time needed to wear temporary and definite prostheses show statistically significant difference between all three groups, as well as the duration of rehabilitation in days, $p < 0.01$.

Conclusion: 1. The success of prosthetic rehabilitation depends on the biomechanical properties of the residual functions. 2. Post-traumatic sequelae extend the rehabilitation in all three subgroups. 3. Psychosocial rehabilitation has a positive effect on the course of rehabilitation. 4. New trends of modern prosthetic components have positive influence on the success of prosthetic rehabilitation.

Key words: Amputation, amputation stump, prosthesis, rehabilitation

O – 052

Abstract No.: 13710227692591

REHABILITATION OF GAIT IN SUBACUTE POST - STROKE PATIENTS

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Introduction: Great interest of rehabilitation is to restore gait ability of stroke patients. Improvement of walking promotes participation of patients in everyday community activities and allows better quality of life. Significantly reduced walking speed represents large barrier for independent performance of persons' daily activities.

Material and methods: We have conducted a 4 - week clinical trial of 24 subacute stroke patients with 6 - month follow-up. Objective was to assess the effectiveness of conventional gait training for people with subacute stroke. All subjects received 4 weeks of conventional physical therapy based on individual needs (stretching exercise, PNF and Bobath concept, cardiovascular exercises, gait training). The outcome measures were Barthel index and gait speed. Patients were instructed to walk at their natural pace and to use the regular gait assistance. Assessments were made at the beginning, at the end of the 4-week intervention program, and 6 months after the program.

Results: Changes showed significantly better improvement in the gait speed after 4 weeks of treatment and in 6 months after the program ($p < 0.05$) compared with gait speed at the beginning of the trial. On the contrary, small differences in Barthel index scores were not significant at any point of study.

Conclusion: The results of this small clinical study indicated significant improvement in gait speed of subacute stroke patients after rehabilitation treatment which remained after 6 months. Gait speed is an important factor related to independent community walking, but ability to walk in real life is also determined by several other factors such as balance, endurance, assistive walking device etc. For clinicians is important to further explore alternative forms of testing and training stroke patients in order to improve gait ability.

Key words: rehabilitation, gait, stroke, clinical trial

NEUROPHYSIOLOGICAL ASSESSMENT IN PELVIC FLOOR DISORDERS

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Electrodiagnostic medicine is assuming now an increasing role in the diagnosis and management of pelvic floor disorders.

Electrodiagnostic tests are divided into four main parts, covering:

- Electromyography: It has been performed with two distinct aims. The first is to assess the integrity of innervations in pelvic floor muscles and the second is to examine sphincter activity during bladder filling and voiding in urodynamics.
- Sacral reflexes: which are reflex contractions of striated muscle structures in the pelvic floor which occur in response to stimulation of the perineum or genital region. They are useful in studying lower motor neuron lesions affecting pelvic floor function. Different forms of sacral reflexes have been described: pudendo anal reflex, urethral anal reflex, bladder anal reflex and Bulbo-cavernosus reflex.
- Pudendal nerve conduction studies.
- Cortical and visceral evoked potentials: Cortical and spinal responses can be obtained from pudendal nerve stimulation, or bladder stimulation.

Clinical Applications: Electrodiagnostic tests are used to investigate patients with:

- Different types of fecal and urinary Incontinence
- Congenital sphincter malformation
- Sphincter muscle dyssynergia
- Therapeutic uses: Botulinum injections in sphincter muscle dyssynergia are performed with EMG guidance.

O – 054

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NEW METHODOLOGY FOR GAIT ANALYSIS IN A PATIENT WEARING AN ANKLE - FOOT ORTHOSIS

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Introduction: To present an instrumented ankle-foot orthosis (AFO) that allows the evaluation of temporospatial and cinesiologic parameters of gait in different phases and environments, such as irregular pavements and stairs. Application of the instrumented AFO in a stroke patient with spastic hemiplegia and evaluation of different gait parameters before and after Botulinum Toxin application.

Materials and methods: Utilization of an AFO, instrumented with a resistance wire extensometer, calibrated in a laboratory. Tests were performed on a patient with left hemiplegia due to ischemic stroke. Gait parameters were evaluated during three different protocols: corridor, stair and outdoor, and at two different periods: before and after Botulinum toxin application on selected muscles of the lower limb.

Results: Data analysis showed that there was a beneficial effect of the Botulinum Toxin in our patient gait patterns with a better weight distribution during the stance phase, an increase in cadence, a drastic reduction of the co-contraction peak detected in the beginning of the swing phase and a shortening of the stance phase during climbing and descending stairs.

Conclusions: This methodology is inexpensive and was successful in evaluating different gait parameters in a patient with spastic hemiplegia using an AFO. By allowing the evaluation of gait parameters outside the gait laboratory, such as in rough terrains and stairs, it holds an unmatched versatility compared with others mentioned in the literature.

Key words: Gait analysis, Ankle foot orthoses

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RELATIONSHIP BETWEEN FUNCTIONAL CAPACITY AND PLASMA B TYPE NATRIURETIC PEPTIDE LEVEL WITH CARDIAC REHABILITATION IN PATIENTS WITH HEART FAILURE

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Introduction: The Six-minute walk test (6MWT) is an effective tool for assessing the functional capacity in the patients with chronic heart failure (CHF). The plasma N-terminal B type natriuretic peptide (NT-proBNP) is mostly synthesized in the left ventricle and its levels depend upon the volume /pressure overload. BNP levels are used in diagnosis and prognosis in CHF patients.

Aim of the study was to evaluate whether the plasma levels of NT-proBNP, are linked to functional capacity, as assessed by 6MWT, after exercise training in ambulatory CHF patients.

Materials and methods: We studied 50 outpatients (age 62.9±8 yrs, 40 males and 10 females) with CHF (EF < 40% by echocardiography) secondary to ischemic heart disease. All patients were in stable clinical conditions and in optimal medical treatment. Patients underwent an exercise training program consisting in 21.6±6.9 sessions of moderate intensity, continuous aerobic exercise. 6 MWT and NT-proBNP were assessed before and after cardiac rehabilitation

Results: No changes in drug therapy occurred during the study period. After exercise training the distance walked at 6MWT increased significantly from 434.20±17.89 to 524.68±20.14 meters (p<0.001) and NT-proBNP levels decreased significantly from 444.51±159.4 to 310.14±105.44 pg/ml (p<0.001). However, there was only a weak, non significant, negative correlation (r=- 0.114) between changes in the 6MWT and changes in NT-proBNP.

Conclusion: Our data suggests that in CHF patients exercise training improves both functional capacity and central hemodynamics, as reflected by NT-proBNP. However, these effects are not related one each other. These finding would confirm that the benefits of exercise training in CHF patients rely mainly on peripheral mechanisms, although a positive cardiac remodeling may also occur.

Key words: N-terminal B type natriuretic peptide, Six-Minute Walk Test, Chronic Heart Failure

O – 056

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**USEFULNESS OF IN – HOSPITAL REMOTE TELEMETRY IN CARDIAC REHABILITATION
UNITS. OUR CENTER EXPERIENCE**

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Introduction: Cardiac remote telemetry is the transmission of cardiac signals from a patient to a distant receiving location with a goal of rhythm monitoring to ST segment monitoring and sophisticated arrhythmia detection and diagnosis under surveillance of trained personal. We aimed to investigate the usefulness of cardiac telemetry in patients' admitted after coronary artery by pass surgery (CABG) or percutaneous coronary intervention (PCI) in our in-hospital cardiac rehabilitation center.

Materials and methods: Out of 1676 patients admitted for in-hospital cardiac rehabilitation, we studied one hundred two patients with previous CABG (51%) or PCI (49%), 63% males, aged 63.78 ± 8.01 years). Risk factors were noted, blood was sampled for analyses. Exercise test were performed on admission and after 21 days of in - hospital rehabilitation. According to the first test results patients were selected for exercises program: free walking, cycle and/or Nyllin steps. During the exercise patients were continuously monitor by using wireless cardiac remote system of 3 channels. signals were transmitted to the central work station. The surveillance of the displayed signals was continuously assessed in real time by a personal trained in arrhythmia recognition supervised by a cardiologist.

Results: By using cardiac remote monitoring ST segment depression ranging from 0.5 to 1.5 mm was detected in 4% of pts, while rhythm disorders were detected in 30% of patients: paroxysmal atrial fibrillation, VES, SVES. Right bundle branch block de novo was detected in 2% of the patients and was bad prognostic parameter.

Conclusions: Cardiac remote telemetry is useful diagnostic tool in cardiac rehabilitation program, especially in patients after surgery in whom paroxysmal atrial fibrillation is common disorder.

**EFFECTS OF CARDIAC REHABILITATION IN FUNCTIONAL CAPACITY AND
CARDIOVASCULAR RISK FACTORS IN PATIENTS WITH TYPE 2 DIABETES**

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Introduction: Cardiac Rehabilitation Programs (CRP) are recognized as an integral part of a comprehensive plan of care for patients with cardiovascular disease. Individuals with Diabetes Mellitus (DM) have 2 to 4 times the risk of developing and dying from Coronary Heart Disease (CHD) when compared with non-diabetic patients. Meta-analyses have shown a profound benefit of CRP in the overall population. However there are limited data that specifically address CRP in diabetic patients, although such programs may be especially important in this group of patients. The purpose of this study was to determine whether Type 2 diabetic patients with coronary disease can obtain, after CRP, a similar benefit in functional capacity and cardiovascular risk factors to non-diabetic coronary patients.

Materials and methods: A prospective cohort study was carried including 682 patients, who completed an hospital based CRP (phase II) between January 2008 and June 2012. Two groups were considered: diabetic and non-diabetic patients. Diabetics group included those with previous DM or on anti-diabetic medication. Patients were evaluated in the first consultation and three months later and the following parameters were recorded: body mass index (BMI), waist circumference, lipid profile, glucose and glycosylated hemoglobin, blood pressure, smoking habits and weekly physical activity habits (measured by the International Physical Activity Questionnaire). Functional capacity was estimated in METs (metabolic equivalents) achieved in treadmill exercise test at the beginning of CRP and three months later.

Results: The sample included 682 patients (253 diabetics and 429 non-diabetics). Diabetic patients were significantly older ($61,6 \pm 9,1$ vs $58,6 \pm 11,0$ years; $p < 0,001$), had a worse cardiovascular risk profile (higher prevalence of excess weight ($80,6\%$ vs $60,1\%$; $p < 0,001$), dyslipidemia ($76,3\%$ vs $64,3\%$; $p = 0,005$), hypertension ($70,4\%$ vs $52,4\%$, $p < 0,001$), sedentary lifestyle ($61,3\%$ vs $49,7\%$, $p = 0,013$)) and had a lower functional capacity ($7,8 \pm 2,0$ vs $9,1 \pm 2,4$ METs; $p < 0,001$) than non-diabetic patients. At the end of the CRP, all patients achieved significant improvements in all cardiovascular risk factors ($p < 0,001$) and in functional capacity ($p < 0,001$). Improvements were similar in diabetics and non-diabetics for all parameters except: average reduction in BMI levels, was significantly higher in non-diabetics ($0,9 \pm 1,2$ vs $0,7 \pm 1,0$ Kg/m²; $p = 0,008$); average reduction in triglycerides levels, was higher in diabetics ($36,8 \pm 78,2$ vs $21,8 \pm 54,8$ mg/l; $p = 0,007$); functional capacity gains, were higher in non-diabetics ($1,5 \pm 1,2$ vs $1,3 \pm 1,2$ METs; $p = 0,042$).

Conclusions: This study emphasizes the capacity of diabetic patients to fully benefit from a CRP and demonstrates that the extent of improvement in cardiovascular risk factors but not in functional capacity is similar in diabetic and non-diabetic patients.

Key words: Cardiac rehabilitation; diabetes mellitus; cardiovascular risk factors; functional capacity

COMPLEX ANALYZIS OF NATURAL AREAL FOR REHABILITATION TREATMENT

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Introduction: Correlating medical scientific research with the challenges of specific scientific and technical developments in the XXI century is a goal for the standardization of functional medical recovery protocols for the rehabilitative medicine.

From the level of nanostructures to the level of the whole body, the correlations between the climate natural factors and the influence of climate changing are top priorities in the field. Given the general trend of aging population, increased costs for tertiary care of the elderly and the modern concept in European Union “Well health aging”, there is a need to increase the quality of primary prevention in older people. Thus, the correlation of the natural climatic factor and the influence of the climatic changes is needed to be standardized for the therapeutic protocols in rehabilitation.

Materials and methods: We analysed a natural geographical area which has beneficial influence on health status. The analysed factors are: air, water, soil and subsoil, salt mine and social status. The area chosen was Cacica saline, with the two locations: the church hall and the sport hall; it was studied beginning with 19.05.2004 and the following parameters were noted: air temperature, atmospheric pressure, surface altitude, altitude in the saline, level difference. The aerosol concentration was estimated based on the data obtained by means of the particle counter and of the conduct metric method for the two chambers of the saline.

Results: The Cacica area and village has a excellent potential for the development of medical rehabilitation and medical tourism for rehabilitation.

The salt mine, with the results for the parameters studied show that: -air temperature: 11.0 –12.0 0C; -atmospheric pressure: 100925 Pa (757 mmHg); -surface altitude: 447 m; -altitude in the saline: 416 m; -level difference: 31 m.

The Cacica saline shows quite different concentrations for the two locations (0.356 mg/m³ in the church hall and 0.234 mg/m³ in the sport hall) but the values determined by the two methods are very close. The impurification degree of the aerosol is lower (~10%) and it shows a very good stability of the submicron particles (<0.5µm).

These results allow the therapy of respiratory pathologies (allergic and chronic diseases).

Hydrotherapy is performed with saline water, increasing the degree of movement and the effectiveness of the process.

Wooded landscape of over 70%, as well as location of the village ensures activities of rehabilitation medicine.

Development of social factor is determined to be the most important for accomplishing European level for medical recovery and medical tourism.

Conclusions: Cacica represents a beneficial climatic area for functional medical rehabilitation.

This can be accomplished by speleotherapy in the salt mine, hydrotherapy and physiotherapy at the ground level in special resorts for these activities. Medical activity should be performed by high level of technology for diagnostic and treatment.

Key words: Speleotherapy, saline hydrotherapy, balneo-climatic area, Cacica

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DIAGNOSIS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN PATIENTS WITH CORONARY DISEASES WHO PARTICIPATED IN CARDIAC REHABILITATION PROGRAM

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Introduction: The prevalence of chronic obstructive pulmonary disease (COPD) in patients with coronary artery disease (CAD) is not well known, although both have similar risk factors and pathophysiological determinants.

Aim: To define the prevalence of COPD in CAD patients on cardiac rehabilitation program.

Methods: Medical records of 199 patients who participated in cardiac rehabilitation program in period January-April 2011 were retrospectively analyzed. One-hundred-fifty-five had previous myocardial infarction treated with primary percutaneous coronary intervention (MIpPCI), and 44 underwent coronary artery bypass surgery (CABG). The diagnosis of COPD was confirmed on clinical and spirometry findings in 33 patients (17%), 22 with MIpPCI, and 11 with CABG. Of them, 27 (82%) were men; mean age 63±9 years, FEV₁ 75±21%, and FEV₁/FVC 61±9%, respectively. COPD was newly diagnosed in 25 (76%) patients. Compared to those without COPD, patients with COPD were more likely to be smokers (p=0,003), but with no significant difference in age and prevalence of cardiovascular risk factors (hypertension, diabetes and dyslipidemia).

Conclusion: COPD appears to be relatively frequent in CAD patients. Pulmonary function test should be recommended to smokers with CAD, what would help in establishing of early diagnosis and treatment of COPD, and subsequent improvement in their prognosis.

Key words: COPD, coronary disease, cardiac rehabilitation program

THE INFLUENCE OF SPINAL CORD INJURY LEVEL ON PULMONARY FUNCTION

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Introduction: Injury to the spinal cord diminishes the function of respiratory muscles. We sought out to assess factors that influence pulmonary function in spinal cord injury (SCI) patients. Spinal cord injury level, smoking habits, age and body mass index were analyzed.

Materials and methods: A retrospective cohort study based upon spirometry data collected from 96 subjects followed between 1997 and 2012. Subjects were characterized by level of lesion as: high tetraplegia (C5 and above), low tetraplegia (C6-8), high paraplegia (T1-6) and low paraplegia (T8-T12). Inclusion criteria required a minimum age of 18 years, subjects without tracheostomy or requiring ventilation, an initial pulmonary function test up to two years post SCI, two or more follow - up spirometric tests per participant ranging from a span of one to six years with an average duration of 2.5 years between tests. All subjects realized the pulmonary function tests while participating in a comprehensive inpatient rehabilitation program.

Results: A total of 71 male and 25 female participants realized 208 pulmonary function tests. Mean age at initial testing was of 39,83 years (18 – 74 yrs). Fifty - eight subjects had complete motor lesions. One - way ANOVA analysis established a significant linear trend, characterized by initial forced vital capacity (FVC) and forced expiratory volume in 1 s (FEV1) inversely correlated with the level of injury (i.e., the higher the level of injury, the lower the parameter). We did not verify a significant correlation between longitudinal decline of pulmonary function and level of injury. A multivariate analysis of age, smoking habits and body mass index was realized. A significant correlation between these factors and pulmonary function was not established.

Conclusions: Initial FEV1 and FVC values were significantly related to SCI level. The level of injury may be overshadowing the effects of other factors. The lack of longitudinal decline in lung function after SCI may be due to possible benefits from rehabilitation.

Key words: Respiratory function test; longitudinal studies; spinal cord injury; body mass index

**CARDIOVASCULAR REHABILITATION OF PATIENTS AFTER PRIMARY PERCUTANEOUS
CORONARY INTERVENTION WITH STENT IMPLANTATION**

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Exercise training reduces the levels of fibrinogen and plasminogen activators and modulates platelet activation, thereby reducing the risk of restenosis and acute coronary syndromes after PCI.

Purpose of our study is to determine the effect of controlled physical treatment on the further course of the disease and complications.

Methods: this study included 140 patients after acute myocardial infarction of both sexes divided into three groups. The first group with bare metal stents implantation (57 patients; 14 men, 43 women; average age $56,60 \pm 11,55$); the second group with drug-eluting stents implantation (33 patients; 27 men, 6 women; average age $59,85 \pm 9,12$) and third group treated with standard medications therapy (50 patients; 8 men, 42 women; average age $55,40 \pm 12,87$). We have registered the next risk factors: diabetes, hypertension, lipids, obesity, smoking and heritage. All patients were treated following early rehabilitation with: diet, exercise groups I and II, walking (programmed, in the intervals) a speed of 3-4 km/h, cycle to 3x50W, Nyllin-step 5x1 and 5x2. All were followed with telemetric electrocardiogram and have had 24h holter electrocardiogram.

Results: statistically significant difference ($p < 0003$) between the groups in the occurrence of new disorders of cardiac rhythm was observed in group II. T wave changes ($p < 0001$) are the most recorded in third group as well as the largest number of positive ergometer tests load ($p < 0002$). There were no statistically significant differences between the groups in the occurrence of early complications.

Conclusion: women tends to have bad coronarografy assessment, men make better measures of cardiovascular rehabilitation and greatest number of complications in the form of arrhythmias was noted in the group with drug-eluting stents. We found that cardiac rehabilitation after coronary revascularization was associated with improvements in patient physical functioning as well as their adoption of secondary preventive measures.

Keywords: cardiovascular rehabilitation, myocardial infarction, arrhythmias, coronary revascularization

**DOES PHYSICAL THERAPY WITH PHARMACOLOGICAL TREATMENT
(CORTICOSTEROIDS ALONE OR PLUS ANTIVIRAL), REDUCE THE RISK OF LONG-TERM
FACIAL PARESIS IN BELL'S Palsy?**

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Introduction: Bell's palsy remains idiopathic, but a proportion of cases may be caused by reactivation of herpes viruses. Although corticosteroids (CCT) are widely used as first line treatment, recent evidence suggests that antiviral (AV) agent provides minimal added benefit to CCT. However there is little evidence information relating to the effectiveness of CCT (alone or plus AV treatment), combined with an early Physical Therapy (PT) program.

The aim of this study is to evaluate the benefit of a PT program combined with different pharmacology treatment, in new-onset Bell's palsy.

Materials and methods: In this retrospective study, we examined records of 20 adults, who were diagnosed Bell's Palsy from September 2011 and December 2012 and were admitted for outpatient rehabilitation program. The PT program consists of patient re-education with mirror exercises, proprioceptive neuromuscular facilitation, neuromuscular re-education, manual massage and ice stimulation in order to increase specific muscular group power. We evaluated functional motor result using House-Brackmann (HB) staging, immediately before and after the PT program. Clinical data was analyzed and the patients were divided in 2 treatment groups – CCT+PT group (corticosteroids plus physical therapy) and AV+CCT+PT group (antiviral plus corticosteroids plus physical therapy). Data analysis was performed with SPSS software. Continuous variables were expressed as mean (standard deviation – SD) and categorical as proportions. We proceed to the comparison of two treatment groups using qui-squared test. Recovery based on the gain HB score was analyzed with Mann-Whitney test and Spearman correlation test.

Results: 70% patients were female, and mean age was 39 years (sd 15years). Average time between diagnosis and starting physical therapy treatment was 24 days (sd 9days). All patients had functional recovery based on HB gain. 13 patients (65%) on the CCT+PT group had mean initial HB score 3,77, and the others 7 patients (35%) on the AV+CCT+PT group had mean initial HB score 3,43 ($p < 0,005$ test). Long term paresis were observed in 3 patients in CCT+PT group (mean final HB score 1,36) and in only one patient in AV+CCT+PT (final HB score 1,42). We did not find statistically difference in HB mean gain in both groups ($p > 0,05$). We verified positive correlation between initial and final HB score in CCT+PT group (Spearman correlation coefficient 0,63 ($p < 0,05$)).

Conclusions: Prognosis of Bell's palsy is fair with complete recovery in about 80% of the cases, 5%-15% remain with severe sequelae. In this study we also find that 4 patients (20%) had sequelae that were minimal (HB final score 1,36 in CCT+PT group, and 1,42 in AV+CCT+PT group). The present study did not show different outcome in patients with Bell's palsy treated with CCT+FT, as compared with patients given AV+CCT+FT treatment. However we find that higher initial HB score was associated with higher final HB score in CCT+FT, although the correlation coefficient was moderate (0,63).

Key words: Physical Therapy; Corticosteroids; Antiviral; House - Brackmann scale

EFFECTIVENESS OF DRY NEEDLING THERAPY IN COMPLEX REGIONAL PAIN SYNDROME: A COMPREHENSIVE RETROSPECTIVE CLINICAL AUDIT

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Introduction: Complex regional pain syndrome (CRPS) is considered to be an exaggerated protective response that is almost always triggered by tissue trauma but, once »set in«, is maintained by central mechanisms. Cardinal signs of CRPS are spontaneous burning pain, allodynia, autonomic dysfunction, and limited sensory and motor function. The patients with CRPS visiting the outpatient clinic of our Institute have been involved in a rehabilitation programme including dry needling therapy (DNT) for the last seven years, so we conducted a comprehensive clinical audit to evaluate the outcomes of our approach.

Materials and methods: We analysed a non-random purposive sample of 72 patients (36 with involved arm and 36 with involved leg) who attended our inpatient rehabilitation programme between 2006 and 2012 and met the IASP diagnostic criteria for CRPS type I or type II for research work. The explanation given to the patients was that DNT opens the »pocket« containing painful chemicals produced by nerves and immune cells in the local area, so that blood flow can wash out these chemicals and enable pain relief. This way, the patient can visualize the healing process. In addition, it was explained that improvement is expected in 90% of acute cases and that numerous case reports about successfully treated patients have been published. DNT was applied in the most painful spots as identified by the patient. Manual massage (with the treated spots covered by sticking plaster) was applied for the subsequent 20 minutes. The pressure pain threshold was measured before and after the treatment using an algometer, and the results recorded on a body chart. The procedure was performed weekly, depending on improvement. Changes in temperature, oedema, skin colour, sensation and range of motion were rated and recorded. Pain intensity (maximal, minimal, mean and current) and interference (with general activity, mood, walking ability, normal work, relations with other people, sleep and enjoyment of life) were assessed using the Brief Pain Inventory (BPI) on a 0-10 visual analogue scale. The total interference score was adjusted by skipping the walking ability item for the patients with involved arm and the general activity item for the patients with involved leg. Missing data were imputed using the last-observation-carried-forward method. Analytical data visualisations were produced and bivariate statistical analysis were performed. A multiple logistic regression model was built for predicting dichotomised overall outcome (success vs. no or imperfect success).

Results: The time between the 1st and 2nd assessment was 1-39 days (median 7, mean 10.3 days); and 4-92 days (median 15.5, mean 22.9 days) between the 2nd and the 3rd assessment. All four BPI pain intensity scores diminished statistically significantly over the observation period. The number of painful spots significantly diminished and the pain pressure threshold significantly rose. BPI pain interference score significantly diminished between the therapies. Sensation, oedema, skin colour, and range of motion also significantly improved. Concomitant chronic widespread pain, involved limb and time since CRPS onset did not prove to be associated with the overall outcome.

Conclusions: Dry needling therapy with subsequent massage and accompanying explanations induces a highly effective self-healing process in the whole neural network of the persons suffering from CRPS, resulting in markedly diminished pain, improved clinical signs and better overall function.

Key words: complex regional pain syndrome, dry needling therapy, outcomes, outpatient rehabilitation

**TREATMENT OF FROZEN SHOULDER IN PATIENTS AFTER STROKE USING
ACUPUNCTURE AND EXERCISE THERAPY: A SINGLE - BLIND RANDOMIZED CLINICAL
STUDY**

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Objective: To investigate the short - term clinical effects of acupuncture as an adjunctive treatment to exercise therapy in patients with frozen shoulder after stroke.

Design: Single-blind, randomized controlled clinical study.

Setting: The study was carried out between May 2007 and April 2008 at the Department of Neurology, Military Medical Academy and the Special Hospital for Prevention and Treatment of Cerebrovascular Diseases "Saint Sava", Belgrade, Serbia.

Patients and Intervention: One hundred subjects were divided into two therapy groups: Group A included 50 patients treated by exercise therapy (ET) alone and Group B, 50 patients treated by acupuncture and exercise therapy (AP-ET). Over a 4 week period, the ET group received 20 treatments, each lasting 30 minutes. The AP-ET group received 20 treatments consisting of 30 minutes ET and 20 minutes acupuncture.

Outcome measures: The primary outcome measure was pain intensity measured by the Visual Analogue Pain Scale. Secondary outcome measures were shoulder movements, the Modified Ashworth Scale (MAS) and Brunnstrom stages of post-stroke motor recovery. Measurements were taken before and at the end of the 4 week treatment period.

Results: Statistically significant differences were found in the AP-ET group for intensity of shoulder pain ($P = 0.00$, $\chi^2 = 70.01$, with high effect size $d = 0.84$), MAS ($P = 0.00$, $\chi^2 = 54.778$, with medium effect size $d = 0.77$), Brunnstrom stages ($P = 0.00$, $\chi^2 = 45.283$, with medium effect size $d = 0.67$), passive abduction ($P = 0.00$, with high effect size $d = 2.62$) and active abduction ($P = 0.00$, with high effect size $d = 1.63$).

Conclusion: Acupuncture combined with ET was found to have positive effects on shoulder pain and upper limb spasticity after stroke and could be useful in the treatment of frozen shoulder in stroke patients.

Key Words: stroke, rehabilitation, acupuncture, adhesive capsulitis, exercise therapy

EFFECTIVENESS OF MESOTHERAPY ON TEMPOROMANDIBULAR JOINT DISORDERS

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Introduction: Temporomandibular joint disorders (TMJD) are a very common pain disorder however, only a few patients will seek and require medical assessment. The aetiology and the best course of treatment for TMJD remain unclear. There is a general consensus that a conservative, non - invasive approach should be the first - line of treatment. The goal of this study was to evaluate the effectiveness of mesotherapy (intradermal injections at the site of pain), as a viable option for pain relief in TMJD.

Materials and methods: We conducted a case review of all TMJD patients treated since 2006 with mesotherapy procedures only. We utilized mesotherapy to introduce pharmaceutical drugs via multiple intradermal injections (6 - 8 injections). All patients were treated using a cocktail of drugs composing of lidocaine, piroxicam and pentoxifylline, 6cc in total. Ethyl chloride was used for anaesthesia. Patients were treated every 15 days until symptomatic relief is achieved and thereafter every 2 months. Main outcome was complete symptomatic relief, associated factors were analysed.

Results: 27 patients were included (24 females), aged 25 – 80 years old (mean 52,92) and no age predominance was found. Six patients had minor TMJ trauma history. Bilateral affection was present in 8 patients, 10 had only left side affection. Follow up period ranged from only one application to 84 months post initial treatment (median of 19). Complete pain relief was achieved in 26 patients (96%; CI95% 83.1-99.8), the necessary number of procedures to get pain relief ranged from 1 to 6 (median of 1). The total number of treatment sessions ranged from 1 to 40 (median of 11). 19 patients had other painful complains, mainly related with anxiety disorders. A weak correlation (Spearman's $\rho = 0.325$; $p = 0.098$) between anxiety disorders and the required months of treatments was found.

Conclusions: Despite the selection bias, lack of randomization and small sample size, mesotherapy seems to be a valuable option on pain relief in a temporomandibular pain syndrome with none of the systemic effects of oral medication. Anxiety may have a role on the aetiology and therapeutic success that highlights the holistic approach of these patients. There is a scarce amount of published literature respective to the application of mesotherapy in temporomandibular pain disorders. Further studies are necessities to validate this approach.

Key words: temporomandibular joint disorders; mesotherapy; pain

SHOCKWAVE – NON-SURGICAL TREATMENT WITH RADIAL WAVES – METHOD DISPLAY

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Introduction - Shockwave treatment with radial waves is modern noninvasive method of rehabilitation of patient with painful shoulder, tennis elbow, pain in hamstring muscles, jumper's knee, inflammation of Achilles tendon and bone thickening.

Objective - Objective of this paper is to show this method of treatment with radial shockwaves as remarkable method in treatment of painful musculoskeletal conditions.

Method - Technology of radial shockwave therapy was first time used in medical purposes 20 years ago, in of kidney stones elimination, without damage of skin or tissue. Some of the side effects that have been observed during using of this technology, such as faster bone healing and faster tissue regeneration, led to the development of shockwave apparatus and radial waves therapy, which is now widely used in physical medicine. It is unique and non-invasive solution for pain associated with musculoskeletal system, three to four treatments at weekly intervals, and the therapeutic period lasts only a few minutes. Shockwave is an acoustic wave which carries high energy to the painful fibrous tissue or musculoskeletal tissue with sub-acute, sub-chronic and chronic conditions. This energy promotes healing, regeneration and reparation process in tissue and soft tissue. Shockwave therapy apparatus and radial waves are used for conditions such as painful shoulder, tennis elbow, pain in the pelvic area and hips, jumper's knee, pain in the hamstring muscles, bone thickening, Achillodynia - a painful condition Achilles tendon. Shockwave device is used in treatment of calcification in ligaments, tendons and muscles. It is also used for stimulation of muscle trigger points, the regeneration of muscle and connective tissue, as well as acupressure therapy, with lymphatic drainage. Excellent results of shockwave radial waves treatment are shown during treatment of cellulite and body shaping. Radial shockwave offer non-invasive solution to the problems in connective tissue, tendons problems, pathologies of the soft tissue and the occurrence of calcification. The important reasons for the application of radial shockwave therapy in the rehabilitation process of patients are reduction in pain, boosting of the metabolism, tissue revascularization and normalization of muscle tone.

Results and relevant evidence - Radial shockwave therapy stimulate revascularization of the treated tissue, leading to regeneration. Shockwave therapy reduces muscle tension and prevents spasm. Hyperemia is one of the basic effects of shockwave therapy. It provides a better blood supply and better energy supply of hypertonic ligament and muscle structure. After application of shockwave treatment patient feels significant reduction of pain. Intense pulses that are transmitted in the tissue creating a strong nociceptive activation of alpha and beta fibers that affect interneurons, which then inhibit the transmission of pain signals. Besides reducing pain, using shockwave therapy reduces the risk of developing edemas.. Shockwave therapy has resulted in production of sufficient quantities of collagen, which is essential for the process of repairing damaged musculoskeletal and ligamentous structure. . Shockwave therapy accelerates the elimination of nociceptive metabolite, improves oxygenation and supplies damaged tissue source of energy. This method speeds up the metabolism and supports the removal of histamine and other LA irritative and harmful substances. Radial shockwave waves acting on the tissue at the cellular level. Free radicals that are emitted from shockwave device affect the chemical environment by stimulating cells that can emit substances that reduce pain and reduce inflammation. With the help of radial shockwave therapy waves dissolve hardened fibroblasts

and starts biochemical decalcification, which increases the mobility of the treated segment. Shockwave can provide massage effect, which successfully solves the trapezoid muscle stiffness in his back.

Conclusion: Shockwave therapy is extraordinary and non-invasive treatment method with almost no negative effects. At the same time, shockwave therapy is a method that leads to pain reduction, better mobility and functionality of the patient, and thus contributes to a better life quality.

Keywords: Shockwave therapy, radial waves, pain, calcification, spasm

O – 067

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**SHOULDER DISLOCATION WITH EXTENSIVE PERIPHERAL NERVE DAMAGE:
OVERVIEW OF REHABILITATION IN THE PERIPHERAL NERVE INJURIES**

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Introduction: The glenoumeral joint is the most frequently dislocated articulation in the body. Anterior dislocations are the most common and may be associated with some complications such as neurovascular injuries, bone fractures, tearing of the muscles, ligaments and tendons and shoulder instability.

The aim of this study is to report a case of an anterior glenoumeral joint dislocation associated with extensive peripheral nerve damage and highlight some diagnostic and therapeutic findings. **Case report:** A 63 years-old male that suffered a fall from his own height on an outstretched arm and seek for medical help one day after the event, presenting at the emergency department with shoulder deformity, pain and signs of neurological lesion. It was diagnosed an acute traumatic anterior dislocation of the right shoulder and immediate closed reduction and immobilization (with velpau bandage for 2 weeks) were successfully performed although without reversal of deficits. At our evaluation, 1 month after the event he reported severe hand and forearm pain with alodynia and severe motor deficits and functional limitation. Electromyography (at 1 month) revealed: "severe injury in musculocutaneous nerve (...) moderate sensory-motor axonal lesion of radial nerve (...) slight sensory-motor lesion of median and cubital nerves (...)". He started rehabilitation program with physiotherapy and pregabalin, with progressive clinical and functional improvement.

Discussion: In the present case, the delay in seeking for medical help may have contributed to a worsening of the associated nerve injury.

Conclusion: Early recognition of a shoulder dislocation and its potential complications may have a positive impact on the clinical outcome of patients, so that careful evaluation, prompt treatment and careful follow-up are crucial.

Key-words: shoulder dislocation, nerve injury, rehabilitation

STATIONARY GERIATRIC EARLY REHABILITATION IS WELL KNOWN AND WELL ORGANIZED IN MANY COUNTRIES. BUT IS IT SUFFICIENTLY IN OUTCOME FOR PATIENTS FROM ALL ASSIGNING SPECIALIST DEPARTEMENTS? A RANDOMISED OUTCOMETRAIL OF 1.651 PATIENTS

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Introduction and aims of the study: Stationary geriatric early rehabilitation is very well implemented and sufficiently standardized in many countries. But is stationary geriatric early rehabilitation sufficiently in functional outcome for patients from all assigning specialist departments?

Purpose: Is it possible to reach for all stationary geriatric early rehabilitation patients no matter from which department they come from a sufficient therapeutic progress in functional outcome?

Methods: The retrospective study includes all the patients from 2008 to 2012 which our department of Geriatrics and Remobilization took over from the neurologic, traumatologic, orthopaedic and internal/cardiological departments. The development was measured with the FIM (functional independence measure). The take over FIM was taken inside 72 hours after arriving and the discharge FIM was taken inside the last 48 hours before leaving.

Results: The study contains 1.651 patients, 500 orthopaedic patients with an average age of 75,67 years, a residence time from 16,42 days and a FIM development from 99 to 115 points; 465 traumatological patients with an average age of 81,52 years, a residence time from 18,52 days and a FIM development from 82 to 103 points; 454 neurological patients with an average age of 76,44 years, a residence time from 20,06 days and a FIM development from 76 to 93 points as well as 232 cardiological/internal patients with an average age of 80,29 years a residence time from 17,31 days and a FIM development from 79 to 96 points. The FIM development of all patient groups is 1,21 (+/- 0,13 points) per therapeutic day. The recommended aim value of the American Rehabilitation Counselling Association (ARCA) amounts to 1 FIM point per therapeutic day.

Conclusions: It is possible to obtain a sufficient functional progress for all patients in stationary early geriatric rehabilitation independently from which specialist department they were overtaken from.

Keywords: early geriatric rehabilitation, functional outcome, FIM

CAN PREFRACTURE LIVING STATUS OF THE HIP FRACTURE IN ELDERLY PREDICT THE AMBULATION RECOVERY?

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Introduction: Hip fractures are a major source of morbidity and mortality in the elderly and continue to be a challenge to the health care system. The number of hip fractures occurring each year is increasing as the number of elderly persons in the population increases. Identifying prefracture and hospitalization factors is important, because it may lead to more efficient use of health care resources by targeting patients who would benefit most from a more intensive postoperative rehabilitation program.

Aim: The purpose of this study was to identify whether the living status before the injury associated with recovery of ambulation ability in cognitively intact, geriatric patients with hip fracture.

Material and methods: We prospectively observed 100 patients. Inclusion criteria in this study: patients ≥ 65 years old; prefracture ambulatory independent, cognitively intact and with a femoral neck or intertrochanteric hip fracture of nonpathologic origin. All patients were identified at the time of admission when we collected information on preinjury function, ambulation and housing. Follow up was 4 weeks after surgery. Assessment of cognitive status of patients was performed by SPMSQ and ambulatory independence was measured by FIMTM – motor. Patients were classified as dependent and walking independent.

Results: The average age of the participants was 75.9 ± 6.07 , 77 were women, 33 men. At hospital discharge sixtyseven patients (67%) were in the walkers group and thirtythree (33%) in no - walkers group. Sixtyfour patients preinjury lived in the family and after surgery fortyfive (73,1%) had walking independence, while fifteen (45.5%) had walking dependence. Thirtyfour patients preinjury lived alone and after 4 weeks of follow up, seventeen patients (51,5%) had walking ability while 25,4% had walking dependence. Two patients preinjury lived in institution and 1,5% achieved dependence in walking, while 3% were independent in walking. Chi-square test obtained a high statistical significance in pre-injury living status and postoperative walking ability.

Conclusion: This study focused on prefracture living status and its impact on the recovery of patient's ability to walk. Identifying those patients who would most benefit from a more intensive postoperative rehabilitation program, rehabilitation care can be directed more efficiently. This study provides information that can be used to improve patient outcomes.

Key words: living, hip fracture, prediction of recovery

O – 070

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LUMBAR FLEXION RELAXATION - PHENOMENON IN THE ELDERLY

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Introduction: Lumbar flexion relaxation-phenomenon (FRP) describes the ability to relax lumbar extensor muscles at maximum lumbar flexion position bending forward from an upright standing position with knees extended. Trunk stability in this position is dominated by passive structures. Different classifications of surface electromyography (sEMG) successfully differentiated normal from abnormal results in young individuals performing the task. Moreover FRP was recommended to measure intervention outcome in chronic low back pain patients. Normal aging is associated with stiffness of discoligamentous tissues, loss of range of motion, change of neuromuscular strategies, and trunk muscle recruitment patterns starting at around 50 years of age. FRP has not been investigated comprehensively in healthy elderly subjects.

Materials and Methods. 38 volunteers (20 females, 50-90 years old) and another 43 volunteers (19 females, 18-49 years old) performed static lumbar sEMG and range of motion assessment from upright standing to maximum forward flexion and back to upright standing.

Results. Static sEMG measurements of lumbar extensors in normal male volunteers older than 50 years of age did not show FRP. Both lumbar spine and gross ranges of motion were restricted in this group.

Conclusion. Lack of FRP in healthy elderly men might cause misleading interpretations. Thus lumbar flexion relaxation testing should not be used for differentiation between normal and abnormal conditions nor for evaluation of intervention outcome in this group.

Key words: flexion relaxation-phenomenon, range of motion, elderly

EVALUATION OF BALNEOTHERAPY PROCEDURES EFFECTIVENESS IN ELDERLY AFTER HIP FRACTURE BY FUNCTIONAL INDEPENDENCE MEASUREMENT (FIM) SCALE

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Introduction: Hip fracture presents as emerging problem particularly in elderly population. This type of fracture impact significantly individual's quality of life and affects functional ability. Balneotherapy could be useful in treatment of these patients on several levels, affecting easier performance of motion range, standing with reduced weight and strengthening muscles and as massage tool. The purpose of this study was to evaluate effectiveness of balneotherapy procedures after hip fracture on patients above 65 years of age by functional independence measurement (FIM) scale.

Material and Methods: We have evaluated 203 patients that were referred to Institute for Rehabilitation in Belgrade for rehabilitation treatment after hip fracture. Eligible participants were divided into two groups: Group 1 (N=91) included patients that were introduced with balneotherapy procedures and Group 2 (N=112) included patients that were introduced into rehabilitation program without balneotherapy. Functional status was measured by FIM at admission (Group A), at discharge (Group B), 3 month post discharge (Group C) and 6 months post discharge (Group D).

Results: There is significant increase ($p < 0.001$) in functional recovery in Group 1 (Group A- 46.07 ± 4.46 ; Group B- 67.33 ± 4.41 ; Group C- 78.08 ± 6.30 , Group D- 81.34 ± 3.37) and Group 2 (Group A- 38.48 ± 8.03 ; Group B- 56.58 ± 10.71 ; Group C- 61.54 ± 14.61 , Group D- 63.24 ± 16.20) over the course of rehabilitation treatment and after discharge, except for Group 2 where significant increase lacks ($p = 0.410$) for the period between 3 and 6 months post discharge. Better functional score measured by FIM was noticed for Group 1 versus Group 2 on same occasions when measurements were done ($p < 0.001$).

Conclusion: We have demonstrated that application of balneotherapy along with other rehabilitation procedures for older patients after hip fracture significantly impact functional recovery even in the post discharge period. Therefore, it is recommended that when there are no present contraindications for balneotherapy procedures, the ones should be included into rehabilitation program of elderly after hip fracture.

Key words: hip fractures, elderly, FIM, balneotherapy

**REHABILITATION AFTER ARTHROSCOPIC ANTERIOR SHOULDER STABILIZATION –
EARLY EXPERIENCE**

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Introduction: Arthroscopic stabilization of shoulder, being the leading method in treatment of anterior shoulder instability, was introduced in our Institution in the end of 2010. A good outcome of treatment of patients with shoulder instability depends on the good result of operative treatment as well as on timely initiated and well organized rehabilitation.

The aim of the study is to show initial results in rehabilitation of patients after arthroscopic anterior shoulder stabilization.

Patients and methods: By prospective research, we monitored 23 patients after arthroscopic stabilization of anterior shoulder instability within the period from September 2010 to December 2012. Rehabilitation of all patients started on the first postoperative day and was implemented according to valid protocol through 4 stages of total duration of 6 months. Parameters of monitoring were VAS pain scale, range of motion in shoulder joint, Rowe score, Constant Shoulder Score and Oxford Shoulder Score. The results /preoperatively and 6 months postoperative/ were analyzed using Student's t test.

Results: In 17 patients, the outcome of rehabilitation was very good (73,91%), good result was achieved in 4 patients (17,39%), while 2 patient had satisfactory result (8,7%). There were significant differences in all of the parameters of evaluation ($p < 0,05$) except in the range of motion.

Conclusion: Initial experiences encourage and show necessity of rehabilitation after arthroscopic anterior shoulder stabilization which must be initiated in time and implemented professionally by multidisciplinary team approach. There is a need of constant evaluation and as needed the modification of elements of protocol of rehabilitation by the operator and rehabilitation team.

Key words: rehabilitation, anterior shoulder instability, arthroscopic stabilization

FOLLOW-UP OF 95 PATIENTS WITH BREAST CANCER IN PRM SERVICE

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Introduction: Breast cancer is the most common oncologic disease in women in all developed countries, and in Portugal it has the highest incidence, prevalence and mortality rates. The therapeutic options available can originate complication, with severe repercussions in physical, psychological, functional and social levels. Among these we highlight decreased articular range of motion, decreased muscular strength, skin complications, changes in deep and superficial sensibility, pain sensations, lymphedema, and increased dependency in active day living tasks. The PRM Service in Instituto Português de Oncologica de Lisboa, follows a great number of this patients, attending the treatment, prevention and follow up of any complications inherent to oncologic treatment.

Materials and methods: The Study was made by pre-experimental mode, with the sample consisting in 95 patients what underwent breast cancer surgery and other oncologic therapies, and evaluated has outpatients by the first time in PRM Service between January and April 2011. All the patients were submitted, using a clinical protocol developed by PMR Service of IPO, to physiatric evaluation in the first appointment, after treatment discharge and one year after the first evaluation. The parameters evaluated in the sample were: age, type of surgery, histologic diagnosis, oncologic state, body mass index, oncologic therapies submitted. The variables in this study were: Rehabilitation program submitted, number and type of pós-surgery complications, range of motion in shoulder girdle, intensity of pain, upper limb volumetric. The authors then compared the variables in the sample between the first and others appointments. For statistics were used Spearman and Qui-Square tests for variables comparison, Kruskal-Wallis and Mann-Whitney tests for evaluation of independent variables and T Student test for paired samples.

Results: The most frequent complications in this population in the first appointment were mammary oedema (76.2%), mammary seroma (63.2%), thoracic edema (60.4%). Medium pain intensity of 2.4 (Visual analogical Scale). Between appointments there were improvements in pain symptoms, number of complications, range of motion, and upper limb volumetrics.

Conclusions: This study allowed the characterization of the principal group of outpatients evaluated in PRN Service of IPO Lisbon, allowing to analyze the complications in the first appointment and their evolution and improvement with rehabilitation program submitted.

Key words: Breast cancer, pos-surgery/treatment complications, rehabilitation, follow-up

O – 074

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ANALYSIS OF REHABILITATION OUTCOME IN WOMEN POST-MASTECTOMY IN EARLY STAGE

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Introduction: Mastectomy is a frequently performed, emotionally stressful surgical procedure with important functional and psychosocial consequences. Rehabilitation can reduce post-treatment side effects and improve activities of daily living, quality of life, functional capacity of post-mastectomy patients.

The purpose of this study is to evaluate the effects of rehabilitation treatment among shoulder disability, functional status, pain and quality of life in women undergoing radical or partial mastectomy and axillary dissection.

Materials and methods: Eleven women between 39 and 72 years old, surgically treated for breast cancer, were enrolled in the study at an average of 67 days after surgery. Detailed informations were collected through clinical evaluation and standardized rating scale of pain, function and quality of life assessment. Re-education programs included motor program, instrumental physiotherapy program and ergonomic program.

Results: Our data showed a statistically significant improvements after the rehabilitative treatment. Barthel Index scale, Functional Independence Measure and Neck pain questionnaire revealed a significant reduction in disability during daily activities. Moreover the McGill pain questionnaire indicated a reduction of pain that was the main cause of functional limitation.

Conclusions: From the results of our study, we are able to conclude that both disability and quality of life significantly improved after a comprehensive-integrated rehabilitative treatment consisting of motor program, instrumental physiotherapy program and ergonomic program.

Key words: Mastectomy; rehabilitation outcome; disability

THE VALUE OF PERIOPERATIVE RESPIRATORY REHABILITATION FOR PATIENTS UNDERGOING LUNG RESECTION FOR NON SMALL CELL LUNG CARCINOMA

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Introduction: Lung cancer is one of the most common and deadly malignancy in the world. The average lung cancer patient has a 1-year survival, and only a small fraction of patients are eligible for curative surgery. Today, there is a significant prevalence of chronic obstructive pulmonary disease (COPD) in patients diagnosed with lung cancer - approximately 73% in men, and 53% in women. Surgery in these patients can be associated with increased risk of morbidity and mortality caused by their underlying lung disease. This patient population is likely to have an increased incidence of significant postoperative pulmonary complications such as atelectasis, pneumonia and acute respiratory failure requiring intubation and mechanical ventilation. Even in those lung cancer patients who do not have underlying chronic respiratory disease, physical symptom burden, fatigue, depressive symptoms and performance status may have a profound effect on physical function and predict poorer postoperative outcomes. Today, the beneficial effects of pulmonary rehabilitation (PR) in the COPD population are well documented. PR should include exercise training, both aerobic and strength, self management education and nutritional and psycho - social support. It has been unequivocally shown that targeting secondary impairments associated with COPD, such as peripheral muscle, cardiac, nutritional and psycho - social disfunction, decreases symptoms and improves exercise capacity, functional performance and quality of life. It is likely that PR can be of value for all patients in whom respiratory symptoms are associated with diminished functional capacity or reduced health related quality of life, including those who have non - COPD chronic respiratory disease and pulmonary malignancies.

Conclusions: Although today data are limited for perioperative pulmonary rehabilitation, benefit can be inferred largely from studies done on COPD and PR because of the similarity of patient populations. Today we know that PR works to benefit patients anticipating surgery but it also represents a valuable treatment alternative to patients who are poor surgical candidates. PR seems to be a cost - effective, benign intervention with no adverse effects and should remain an essential component of patient management before lung transplantation, lung volume reduction surgery (LVRS), lung resection and potentially any other elective thoracic surgical procedure.

Key words: lung resection, perioperative rehabilitation

IMPORTANCE OF RESPIRATORY REHABILITATION IN WOMEN PATIENTS WHO UNDERWENT THORACOTOMY

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Introduction: Over the last decade there has been a significant increase in patients suffering from lung cancer who are female. Almost 60% of these patients have associated chronic obstructive pulmonary disease.

Objective: To determine the effect of respiratory rehabilitation in respiratory function and tolerance the effort in the preoperative period

Materials and Methods: We followed a group of 47 female patients with primary lung cancer who were hospitalized at the Clinic for Thoracic Surgery, Clinical Centra Srbije of Surgery. These patients were in the preoperative preparation had respiratory rehabilitation because they had obstructive airway function. Respiratory rehabilitation program lasted approximately two weeks and included a bronchodilator aerosol therapy, kinesitherapy the upper and the lower extremities. As an indication of the measure of success of pulmonary rehabilitation, we used 6MTH, in which we measured the length except odometer value and oxygen saturation and respiratory function. All these parameters were measured on admission to the hospital just before the operation, ie after two weeks.

Results: Statistically significant difference in the values we obtained vital capacity (<0.001) and forced expiratory flow in one second (0.002) when expressed as a percentage and liters. That proved to be a significant difference in the distance 6MTH (0002), as well as oxygen saturation before and after performance of the test (<0.001). We did not notice a significant difference in Tifneovog index and small airways.

Conclusion: Measures of respiratory rehabilitation obviously comes to improving lung function and increase tolerance to effort, as patients with lung cancer much easier operating and postoperative recovery.

Keywords: respiratory rehabilitation, lung cancer, thoracotomy

UPPER EXTREMITY FUNCTION AND QUALITY OF LIFE IN BREAST CANCER RELATED LYMPHEDEMA

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Introduction: Upper limb lymphedema is one of the most frequent complications in breast cancer survivors. Several impairments and activity limitations frequently occur in these patients leading to participation restrictions and influencing Quality of Life. Untreated lymphedema can lead deformity, functional disability, pain and recurrent infections within an edematous limb.

Aim: The aim of this study was to estimate a health related quality of life (HRQoL) in patients with lymphedema after breast cancer treatment and to investigate the correlation between scores of HRQoL and upper limb function and between scores of HRQoL and the size of edema.

Materials and methods: The cross-sectional study included 32 breast cancer related lymphedema patients who treated at Institute of Physical Medicine and Rehabilitation “dr M. Zotovic”, Banja Luka from February to June 2013. The quality of life (HRQoL) was evaluated with the Short Form 36-Item Health Survey (SF-36). Upper limb function was assessed by the Disability of the Arm, Shoulder and Hand questionnaire (DASH). The lymphedema was determined by their arm circumference.

Results: The higher HRQoL score was registered for mental health (45,1 ± 13,2) than for physical one (41,5 ± 8,1), which means that physical disability had more important influence of quality of life deterioration comparing to mental health. The highest values of HRQoL were observed in domains of mental health and social function. The lowest scores of HRQoL were registered in domains of role physical and general health. The mean DASH score was 41,03 (±16,91). Upper extremity function was statistically significantly correlated with the quality of life scores on the role physical and bodily pain domains (p<0,01). There were no statistically significant associated between size of lymphedema and tested domains of quality of life questionnaire.

Conclusions: the presence of breast cancer related lymphedema certainly affects upper limb functioning and quality of life, although we didn't find correlation between size of lymphedema and quality of life. Lymphedema has to be early diagnosed and treated with an adequate rehabilitative plan to prevent activity limitations. It is also necessary develop treatments and programs that can improve of quality of life and upper extremity function in subjects, alongside a reduction in edema.

Key words: lymphedema, quality of life, upper extremity function

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REHABILITATION OF ONCOLOGICAL AMPUTEE PATIENTS

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Introduction: Amputation of lower limb affects the amputee as severe physical and psychological disability. Early rehabilitation is essential and is carried out already at departments for surgery where it focuses on correct positioning of the stump in bed or on a wheelchair as well as on correct application of compression dressing on the stump aimed at the prevention of swelling and stump formation, a prerequisite for successful prosthetic fitting at a later stage. In the University Rehabilitation Center, the amputee patient is included in the complex team rehabilitation program. The final goal of rehabilitation is to enable patients to re-integrate themselves as fully as possible into their previous social life and work.

Aim: Article presents the functional outcome of patients with amputation of lower limb because of oncological disease that were admitted for rehabilitation to the University Rehabilitation Center, Republic of Slovenia, in the period from 2007 to 2012.

Materials and methods: Patients with amputation of lower limb because of oncological disease that were admitted for rehabilitation to the University Rehabilitation Center, Republic of Slovenia, in the period from 2007 to 2012.

Results: Rehabilitation outcome of patients with lower limb amputation we test with Functional Independence Measurement (FIM), with 6 minutes walking test, and 10 meters walking time.

Conclusions: Rehabilitation outcome of patients with lower limb amputation depends on the patients' age, their physical condition, the level of amputation, their primary disease and comorbidities and, last but not least, on rehabilitation program and heightened public awareness.

Key words: amputation of lower limb, oncological disease

**THE POSSIBILITIES OF EARLY REHABILITATION TREATMENT IN PATIENTS WITH
SURGICALLY TREATED COLORECTAL CANCER**

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Introduction: Colorectal cancer is one of the most common cancer. Caught early, it is often curable. The important role in functional recovery of these patients, have enhanced recovery after surgery (ERAS) clinical care protocol and early rehabilitation. The goal of this research is the objective evaluation of the effects of early rehabilitation in patients after surgical treatment of colorectal cancer, respecting their functional recovery and quality of life, before and after rehabilitation

Materials and methods: This study was made as experimental, randomized, controlled clinical trial, opened type. The examination included 73 patients (48 males and 25 females), age from 32 to 85 years, average 60,1, with surgically treated colorectal cancer. All patients had appropriate early multimodal accelerated rehabilitation program. The mean value of this program was 7,65 days. As observing parameter was used short form, 36 items health related questionnaire (SF-36), with two summary measures - Physical component summary (PCS) and Mental component summary (MCS), for the evaluation of quality of life, before and after treatment. For the statistical analysis of the aquired data, before and after therapy, was used Student's t-test.

Results: After therapy, the quality of life of patients was significantly improved, physical health ($p < 0.01$), as well as mental health ($p < 0,01$). SF36 score after rehabilitation, show important improvement of quality of life in early treated patients

Conclusions: According to the results of this study, it can be concluded that early rehabilitation accelerated program, is very efficient in treatment of patients with surgically treated colorectal cancer.

Key words: colorectal cancer; early rehabilitation; life quality

EFFECTIVENESS OF LASER THERAPY ON PAIN AND FUNCTIONAL REHABILITATION OF KNEE OSTEATHROSIS

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Objective: Osteoarthritis (OA) is a multifactoral chronic degenerative joint disorder characterized by cartilage loss, remodeling of subchondral bone and osteophyte formation. Minimizing functional limitation and pain control are two main conditions for optimal treatment of OA. Knee is commonly affected in OA. Drugs, physiotherapy modalities, exercises osteoarthritis. Among physiotherapy modalities, low level laser therapy (LLLT) is frequently used.

Aim: Our study was carried out in order to assess the effectiveness of LLLT in the treatment of knee OA by comparing two different laser therapy regimes.

Method: This study is based on the treatment of patients with gonarthrosis in the Hospital Center “Mother Teresa”, Tirana. This study is a prospective, randomized clinical, comparative. The study was conducted in the period of 3 months (January 2013 - March 2013) and is based on a questionnaire (WOMAC and Lequesne index). 30 patients were obtained in the study. Age 62.5 years old (from 45 years old - 80 years old). A total of 30 patients with a diagnosis of knee OA according to American College of Rheumatology (ACR) criteria were included in the study. The patients were randomly assigned to 3 treatment groups. Group I: actual LLLT applied 60 seconds for each 4 painful areas on the knee surface, 1.8 J/cm² dose + exercise, 10 patients; Group II: actual LPLT applied 120 seconds, 3.6 J/cm² dose + exercise, 10 patients, Group III: placebo laser group + exercise, 10 patients. All patients received a total of 10 treatments, and exercise therapy program was continued during the study (3 months). All patients were evaluated with respect to pain (VAS), degree of active and passive knee flexion/extension, duration of morning stiffness, the need for analgesic (paracetamol) intake, the patient's and doctor's global assessment of therapy regime, painless walking distance and 15 m walking time, Western Ontario and Mc Master Universities Osteoarthritis Index (WOMAC), Lequesne index at the beginning at, the 2nd and 12th weeks. Subjective, physician, and data analysts were unaware of the code for active or placebo laser until the data analysis was complete.

Results: Statistically significant improvements were indicated in many parameters such as pain (evaluated with VAS) and function (evaluated with WOMAC and Lequesne) in the post-therapy period compared to pre-therapy in both active laser groups. In addition we observed that painless walking distance and duration of morning stiffness were also improved. The improvements were more significant in group 2 in which the dosage of laser therapy was twice the other active laser group. Improvements in painless walking distance, 15 m walking time and morning stiffness were also observed in both of the active laser groups as well. On the other hand there were no statistically significant difference between the active and placebo laser groups in the degree of active and passive knee flexion/extension.

Conclusion: In conclusion, the results of this study indicate that treatment with low-intensity laser therapy at two different dosages produces a significant reduction in pain and improvement in function in patients with knee osteoarthritis (AO). Though we found significant differences between the two active laser groups this might indicate that high dosages of LPLT may play a role in reducing pain and functional disability in knee OA.

Key word: knee osteoarthritis; degenerative joint; laser therapy; pain; function

THE CLINICAL EFFECTS OF ACUPUNCTURE AND KINESIOTAPING THERAPY IN THE TREATMENT OF ACUTE LOW BACK PAIN AFTER ACUTE ISHAEMIC STROKE

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Introduction: Back pain is a frequent consequence affecting over 50% of patients after the stroke. The basic causes of back pain after the stroke are changes in muscle strength, tonus and activation, changes in sensibility, atypical movement and lessening movements. Reduction of pain, improvement of muscle strength and enzyme activity, improvement of static and stability during verticalization and walk, accelerates early rehabilitation treatment and returns of patients to everyday activities of life and work.

Aim: To compare clinical effects of acupuncture therapy and combined acupuncture and kinesiотaping therapy in patients with acute low back pain after acute ischemic stroke.

Materials and Methods: Prospective, randomized clinical study included 30 patients divided in two groups. Group A: 15 patients (8 woman and 7 man) of an average age 56 years were treated by needle acupuncture at acupuncture points - UB23, UB25, UB54, UB40, GB34, GB39, St36, and had kinesiотaping applied on m. rectus abdominis, m. quadratum lumborum and lumbar paravertebral muscles. Group B: 15 patients (10 woman and 5 men) of an average age of 59 years were treated by needle acupuncture at the same acupuncture points. All patients had Barthel index above 70 and were able to walk. Both groups had individual training of protecting movements and kinesytherapy program for the acute phase of low back pain adjusted to functional report. Pain was measured by Visual analogue scale, lumbar mobility by Shober measurement and functional disability was assessed by The Functional Independence Measure (FIM) and Oswestry Low Back Disability Questionnaire. Subjects were evaluated on 1st and 14th day of treatment. Data were analyzed by standard statistical methods. Level of signifance were 0,05 in all methods.

Results: Statistical analysis revealed no statistically significant differences between the groups in the intensity of pain, lumbar mobility and functional disability on entry to the trial. Analysis of differences within each group after 14 days of therapy revealed significant decrease in pain intensity, increase in lumbar mobility and reduction in functional disability. When differences between the groups were analyzed after 14 days of therapy, a statistically significant difference was seen, reflecting greater reductions in pain intensity and functional disability and increase in lumbar mobility in the group A when compared with group B.

Conclusion: Acupuncture and kinesiотaping are both effective addition to standard procedures in therapy of acute back pain affecting patients after the stroke. Combination of aplication of acupuncture and kinesiотaping has better effectiveness in early rehabilitation of the patients with acute low back pain after acute ishemic stroke than monotherapy. It leads to significantly faster pain elimination and better results of early rehabilitation of these patients.

NON - TRAUMATIC VASCULAR SPINAL CORD INJURIES

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Introduction: Non - traumatic vascular injuries, either ischemic or hemorrhagic, are an uncommon cause of spinal cord injury (SCI). Our aim was to describe aetiology, socio-demographic, clinical and functional characteristics of patients admitted for a rehabilitation program in a specialized SCI department with acute non - traumatic SCI of vascular aetiology.

Materials and methods: We performed a retrospective analysis of medical records of patients discharged between 01/01/2010 and 31/06/2013 with the diagnosis of non-traumatic SCI of vascular aetiology. Epidemiological and injury aetiology variables were collected, as well neurological and functional outcome measures, including Functional Independence Measure (FIM) and Spinal Cord Independence Measure III (SCIM). We have compared the results with data from patients admitted in our department with SCI from other causes.

Results: A total of 15 patients met the inclusion criteria, ten patients had ischemic and five had hemorrhagic myelopathy. All of them had an acute onset of neurologic symptoms and the event was on average 21 weeks before admission. There was a slight male predominance (53.3%) and the average age was 54 years. Quadriplegia occurred in 20% and complete injury in 26.7% of cases.

Among the patients with spinal infarction, one had the onset of symptoms immediately after an aortic surgery, one patient after an acute myocardial infarction and two patients had spinal dural arteriovenous fistulae associated. No underlying causes were found in the other six patients.

Among the patients with hemorrhagic injury, two had intramedullary spinal cord hematomas associated with Von Willebrand disease and cavernous angioma respectively, two patients had spontaneous spinal subdural hematoma which was associated with haemophilia B in one case, and one patient had a spontaneous spinal epidural hematoma.

The length of stay was on average 17 weeks. The average FIM score at admission was 95.2 and by the time of discharge there was a gain of 14.9. The mean SCIM score was 57.6 at admission and at discharge there was a gain of 18.4.

Comparing the results with the data from other patients, we have found similar average age, but smaller male predominance. The occurrence of quadriplegia and complete injuries was smaller in the vascular group, and so was the length of stay. The admission FIM score and gain at discharge was higher for the vascular SCI group.

Conclusions: Those results are consistent with literature, suggesting a predominant incomplete neurological injury, a smaller occurrence of quadriplegia and a favourable outcome with the rehabilitation program.

Key words: Non-traumatic spinal cord injuries, vascular spinal cord injuries, rehabilitation

NEUROGENIC THORACIC OUTLET SYNDROME

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Introduction: Thoracic Outlet Syndrome (TOS) is characterized by a variety of upper extremity symptoms and signs resulting from neurovascular compression (neurogenic, venous and/or arterial TOS) at the thoracic outlet area. Clinical diagnosis is often difficult, especially in the neurological form (nTOS).

The aim of this study is to present a case report of TOS and highlight some diagnostic and therapeutic particularities.

Materials and methods: Patients with nTOS usually complaints of positional, painful paraesthesia arising in the shoulder and radiating over the superior limb; some report strictly unilateral occipito-frontal headache with facial or jaw pain. Characteristically, it affects young patients, with an average age of 36 and a male preponderance. Patients with nTOS may have normal anatomy (symptoms may be due to traction of the lowest trunk of the brachial plexus caused by scalene hypertrophy) or have cervical rib or congenital or traumatic abnormalities of scalene muscles or cervical - thoracic bones. Most cases have a good response to conservative treatment but, in some cases, surgical treatment may be indicated.

Results: We present a case report of 17 years-old girl, swimmer, with unilateral headache and shoulder pain (for several months), allodynia and hand cramps, associated with progressive functional limitation, turning it impossible to perform sports activity. At the physical examination, there was an evident postural malalignment of the rachis and scapula, shoulder painful abduction and flexion over 45 degrees of motion, positive Wrioth and Adson manoeuvres, positive Ross test. Shoulder MRI, electromyography, cervical spine, chest x-rays have not revealed any significant alteration. Therapeutic strategy consisted of postural advice, pregabalin and physiotherapy for 3 months, which resulted in pain relief, improvement of functional status and health related quality of life.

Conclusions: nTOS is a rare cause of shoulder pain and its response to treatment highly depends on its causative mechanism. Management of TOS in younger patients presents many issues; careful diagnosis and appropriate treatment are crucial.

Key words: Thoracic Outlet Syndrome (TOS), neurogenic TOS, rehabilitation, treatment

**EFFECTS OF MECHANICAL LUMBAR SPINE TRACTION IN TREATMENT OF
NONSPECIFIC ACUTE AND SUBACUTE LOW BACK PAIN**

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Introduction: There are different recommendations for the treatment of patients with nonspecific acute and subacute low back pain (LBP). One of the recommendations is the use of mechanical spine traction. The aim of this study was testing the therapeutic efficacy of mechanical spine traction as an additional form of therapy for patients with nonspecific acute and subacute LBP.

Materials and methods: The study included 76 patients (37 men and 39 women) average age $47,57 \pm 9,42$ years, with nonspecific acute and subacute LBP. The average duration of pain was $4,3 \pm 2,1$ weeks. The examined patients were divided into two groups. First group (n=37) of patients („standard group“) received standard physical therapy (kinesiotherapy, low level magnetotherapy, ultrasound therapy and laser therapy). Second group (n=39) received mentioned standard treatment plus mechanical lumbar spine traction („traction group“). The average age and duration of pain between the groups were not significantly different. Static traction was applied for 12 minutes total (10 minutes at the desired intensity, plus 1 minute to increase and 1 minute to decrease the intensity). The intensity of the pull was 40-60% of the subject's body weight, adjusted on the subject's tolerance and symptom response. All patients received 12 physical therapy sessions over 6 weeks. The pain and its features, as well as degree of disability and the effectiveness of therapeutic procedures, were estimated by visual analog scale, Oswestry Low Back Pain Disability Questionnaire, Thomayer and Schober test, Fear avoidance beliefs questionnaire (FABQ) and Tampa scale of kinesiophobia (TSK). The assessments were made before treatment, at the end of treatment (6th week) and after 3 months.

Results: After 6 weeks of treatment all of the above mentioned tests showed a significant improvement. „Traction group“ had all the results significantly better than the „standard group“. After 3 months the overall results in both groups were significantly better than results before treatment, but the difference between the groups disappeared, because the results were practically equal, except FABQ and TSK results, which in „traction group“ were better than in the „standard group“.

Conclusions: Mechanical spinal traction, added to standard therapeutic procedures, may contribute to a faster recovery of the patients during the treatment of nonspecific acute and subacute low back pain, including longer and better effects on psychosocial risk factors.

Key words: Nonspecific acute and subacute low back pain, treatment, mechanical lumbar traction

RISK FACTORS FOR CEREBRAL PALSY

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Aim: to examine prenatal, perinatal and neonatal risk factors for cerebral palsy in term and pre-term children.

Design: retrospective comparative study

Material/ methods: medical documentation of 65 CP children, born in 2009. and 2010., hospitalized during 2012. in the SHCPDN was evaluated and compared with the documentation of 178 healthy children, born in the same years, referred with anamnestic indications or symptomatic risk development. 26 prenatal, perinatal and neonatal factors were considered.

Results: risk factors were expressed through OR (odds ratio) and 95% CI. Logistic regression analysis identified the following risk factors for the development of CP (Wald coefficient and significance) for all children. Among prenatal factors - mother's infection, OR 0,34, Wald 11,40 $p=0,000$ (factor significant in term children); bleeding during pregnancy, OR 0,45, Wald 5,42 $p=0,020$ (significant in term children). Among perinatal factors - term of delivery, OR 8,18 Wald 24, 29 $p=0,000$; complications with the umbilical cord, OR 6,62, Wald 10,79 $p=0,000$ (significant in term children); PROM OR 3,48, Wald 4,48 $p=0,034$ (significant in term children); methods of childbirth, OR 3,60, Wald 3,67 $p=0,048$ (significant in term children). Among neonatal factors - neonatal convulsiones OR 0,07, Wald 13,22, $p=0,000$ (significant for term and pre-term children); Apgar scor OR 0,187, Wald 11, 04 $p=0,001$ (significant in term children); RDS-OR 0,33, Wald 3,36 $p=0,049$ (significant in pre-term children).

With the Hi square test the following factors show statistical significance according to diagnosis: mother's infection $p=0,029$ RR is 2,5 for CP; bleeding of the mother and medications for pregnancy maintenance. Among perinatal factors - method of childbirth, abnormal presentation, complications with umbilical cord, PROM, narcosis, term of delivery $p=0,000$, RR is 4 for CP. Among neonatal factors - birth weight $<2500\text{gr}$, $p=0,000$ RR is 5 for CP, perinatal asphyxia, RDS, HIC-II,III, IV degree, neonatal convulsiones $p=0,000$, RR is 15 for CP; Apgar scor $p=0,000$, RR is 10 for CP; septicemia. Average number of risk factors per child in the pre-term healthy group is 9,40 and in the CP pre-term group is 10,49 $p=0,190$. Average number of risk factors per child in term healthy group is 3,16 and in CP group is 6,71 $p=0,000$.

Conclusion: numerous factors have been established as risk factors for CP, etiology in some cases remains unclear, further research involving genetic tests are required, as well as constant prevention.

Key words: risk factors, cerebral palsy

ROLE OF PHYSICAL THERAPY AND BOTULINUM TOXIN APPLICATION IN TREATMENT OF DYNAMIC FOOT EQUINUS IN PEDIATRIC POPULATION WITH CEREBRAL PALSY

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Introduction: Spasticity presents the most frequent form of all neurological manifestations in children with cerebral palsy (CP). This leads to the onset of contractures and deformities with permanent functional limitations. For reduction of muscles spasticity, intramuscular botulinum toxin type A (BTA) could be used. Therefore, the purpose of this study was to evaluate effects of BTA on spasticity reduction of feet plantar flexors as well as functional and motoric status in pediatric population.

Material and methods: We have evaluated 24 children age between 2-6 years of life with unilateral and bilateral form of CP. The BTA was administered into the spastic gastrocnemius muscle. Effects of BTA application and physical therapy were estimated by follow-up and further parameters were analyzed: active and passive movements in ankle joint, gastrocnemius muscle spasticity, and functional and motoric status. The spasticity was evaluated by modified Ashworth Scale (MAS). The evaluation and measurements were done 5 times: before treatment, 3, 8, 16 weeks post BTA application respectively and 6 months after BTA injection.

Results: There is significant difference in mean values of active feet dorsiflexion in ankle joint after BTA application ($p < 0.001$) over entire time of follow-up. The lower spasticity levels in gastrocnemius muscle measured by MAS were significantly more frequent after 3, 8 and 16 weeks post BTA application ($p < 0.001$). There is statistically significant improvement in motoric functions after 3 weeks ($p < 0.001$) post BTA application and significant improvement in functional levels after 16 weeks post BTA application ($p < 0.001$).

Conclusions: The BTA application reduces spasticity in gastrocnemius muscle, leading to the correction in dynamic equinus of affected foot and improvement in motoric and functional levels in children with CP.

Key words: cerebral palsy, botulinum toxin type A, spasticity, foot equines

GROSS MOTOR FUNCTION AND MANUAL ABILITIES IN CHILDREN WITH CEREBRAL PALSY

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Introduction: Cerebral palsy (CP) is the most common cause of motor disability in children. It affects 1.5 to 3 children per 1000 live births. The most important clinical feature of cerebral palsy is the impairment of motor skills, which refers to the degree of restriction of motor function in all body regions including the function of speech. The ability to walk is often used as a rough measure for the severity of motor impairment.

The objective of this study was to determine the functional ability of children with cerebral palsy.

Materials and methods: The study included 206 children with cerebral palsy. They were classified according to the Gross motor function classification system (GMFCS) in V levels. Level I refers to best functional ability and level V the most limited motor function. There are four age groups described within each of the five levels of GMFCS (under 2 years, 2 to 4 years, 4 to 6 years and 6 to 12 years). Four to eighteen years old children with CP were also classified according to the Manual ability classification system (MACS) in V levels. Level I relates to the best ability to handle objects in daily life, while in level V there is no ability to handle objects.

Results: Spastic form of CP was present in 86% of cases and diplegia was the most common form of CP. Functional abilities were most limited in quadriplegic and dyskinetic type of CP. Two-thirds of children with CP were able to walk independently or with an aid (level I-III), while third of children had no ability to walk (level IV and V). Limitation of medium level (level III) were present in every sixth child. Half the children were classified according to the MACS classification as level I or II, a fifth of children as level III and less than a third of children were classified as level IV or V.

Conclusions: The GMFCS and MACS classification systems enable to settle rehabilitation goals for each level of motor function according to different age groups.

Key words: cerebral palsy, child, motor disability

**VISUAL EVOKED POTENTIALS IN PREMATURES AND FULL TERM CHILDREN –
COMPARATIVE STUDY**

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Intorduction: Visual Evoked Potential (VEP) measures the visual conduction of the visual pathway from the optic nerve, optic chiasma optic radiations to the occipital cortex. It is used to assess the integrity and relative state of maturation of the visual pathways in infants and children. The VEP is useful in detecting visual conduction disturbance and maturation of CNS, it is not specific with regard to etiology. The aim of our study was to evaluate changes on VEP evaluation in praemature infants compared with age-matched normative data.

Material and Methods: We evaluated 50 praemature infants at University children's hospital when they were sixmonths old (16 were born at 28 week of gestation- First group, 34 were born at 30-33 week of gestation- Second group). Every patient was clinically assessed initially and check-up was done after 6 months. The control VEP parameters were drawn from vlaues for age-matched normative data. The diagnostic method that was implemented was VEP flesh monocular stimulation with detection of cortical responses according to international 10/20 system. Parametres that were followed-up were: presence and shape of cortical responses, latencies and amplitude. The VEP findings were classified into three categories: normal (formed responses, amplitudes and latencies were in physiological limits), mildly abnormal (poorly formed responses, limiting value latency, slightly prolonged latencies) or severely abnormal (prolonged latencies with decreased amplitudes and poor formed responses and absence of cortical responses).

Results: From First group of prematures predominantly severe degree of dysphunction was noticed (8 patients – 50%), while moderate dysphunction was predominant in second group of patients (21 patients – 61.8%). The least frequent from first group was mild dysphunction (2 patients – 12.5%), while for second group severe type of dysphunction (5 patients – 14.7%). Severe degree of dysphunctions on VEP evaluation indicates poor prognosis.

Conclusion: Premature children present more frequently with severe degree of dysphunctions on VEP evlaution. Visual evoked potentials (VEPs) have changed in praemature infants may provide information for long-term prognosis. Praemature infants with mildly abnormal VEPs do not necessarily have a poor prognosis, but should be followed-up as maturational changes or improvements in function of the sensory pathway will be reflected in the evoked potentials. Normal VEPs should be normal outcome.

Key words: prematures, visual evoked potentials, follow-up

REHABILITATION MEDICINE IN PHARAONIC ERA

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The ancient Egyptian called medicine the Necessary Art and they showed a great interest in that art. From the time of the first Dynasty onwards, there existed establishments known as PIR-ANKH OR House of life which correspond to our academies today.

The Edwin Smith papyrus, is attributed to Imhotop 3000 B.C, which is also considered the world's oldest medical document. It includes descriptions, examination procedures, diagnoses & practical treatments for forty-eight injuries, beginning at the top of the head and ending at the shoulder blades and chest. It also includes several important cases alluding to neuroscience that discuss the brain, meninges, the anterior fontanel, spinal cord and cerebrospinal fluid for the first time in the history of mankind.

The Edwin Smith papyrus gives valuable insight into the role of the spinal cord in transmission of information from the brain to the lower part of the body. They were pioneers in the rehabilitation of different diseases of the locomotory system including sports injuries.

The SOURCES of our information are:

1. The Egyptian medical PAPYRI which are the oldest medical books in history
2. Cairo museum collection of statues and mummies & old illustrations shows different types of deformities
3. X-ray of EGYPTIAN mummies shows some diseases of spine and joints.
4. Herodotus book
5. Manchester mummy 1770 which shows wood and leather prosthetic toe which was used by an amputee to facilitate walking

O – 092

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CORRELATION BETWEEN DIABETES MELLITUS AND PARAMETERS OF FUNCTIONAL RECOVERY IN HEMIPLEGIC PATIENTS

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Introduction: Hemiplegia with its occurrence, poor recovery, disability and mortality presents an important medical, social and economic problem of modern civilisation. Diabetes mellitus is a significant risk factor and contributes to poor recovery of hemiplegic patients.

Aim: to establish correlation between prognosis and parameters of recovery in hemiplegic patients with diabetes mellitus.

Materials and methods: A retrospective study was performed at the Institute for Rehabilitation - Belgrade, Selters, Mladenovac. A hundred hemiplegic patients were rehabilitated by using electrotherapy, kinesis treatment and work therapy. The parameters of research were: The Scale of Spontaneous Recovery Prognosis done before RT. Brunstorm scale, FIM scale, MMSE and DMAS scales were used upon admission, after 30, 60 days and after 6 months.

Results: Diabetes mellitus was diagnosed in 42 patients. The Scale of Spontaneous Recovery Prognosis was worse in patients with diabetes 21,524, patients without diabetes 21,362. FIM score and MMSE score were significantly lower in diabetics upon admission, FIM 37,214, MMSE 20,595.

After 30, 60 days and after 6 months they remained significantly lower / FIM score 49,524, 61,643, 66,452. MMSE 22,214, 24,167, 24,452.

Conclusions: Patients with diabetes mellitus have prognoses of worse recovery. It is proved by FIM and MMSE scores on admission and after rehabilitation was finished.

Key words: stroke, rehabilitation, research, diabetes mellitus

THE SHORT-TERM EFFECTS OF ACUPUNCTURE IN THE TREATMENT OF TRIGEMINAL NEURALGIA

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Introduction: Trigeminal neuralgia is the most common craniofacial pain syndrome of neuropathic origin. It may be primary (idiopathic) and secondary (symptomatic). Secondary (symptomatic) neuralgia is the most commonly of otogenic or dental origin, a result of temporomandibular joint dysfunction, viral infections (herpes zoster), endogenous or exogenous intoxication, tumors in the cerebellopontine angle, compression or inflammation around the nerve root or Gasserian ganglion. The cause of idiopathic trigeminal neuralgia is probably compression or vascular changes in the area of Gasserian ganglion, in tr. descendens or the nerve. It is more common in women, after the age of 50, usually in the innervation's area of n. maxillaris, second branches of the n. trigeminus. Pain that occurs during trigeminal neuralgia patients describe as stabbing or electric shock like. It is accompanied by painful tic and is measured in seconds. Periods of pain can last for months to a year and then are followed by periods of remission of the same length. Stimulations that can provoke attacks of neuralgia are chewing, brushing teeth, washing face, makeup and shaving. The current available therapeutic options for management of trigeminal neuralgia include pharmacotherapy and destructive surgical and no surgical methods. Pharmacotherapy of carbamazepine remains the first-line treatment. The aim of this paper is to examine the effects of acupuncture in the treatment of trigeminal neuralgia in patients who reported pain despite medical therapy.

Materials and methods: The clinical prospective study included 7 patients who reported pain despite treatment with carbamazepine. Total of 29 treatments during 4 years was applied in these 7 patients. Local and distant points are stimulated by acupuncture: BL2, GB14, extra3, ST2, ST3, SI18, ST6, LI4. Acupuncture treatment lasted 10 days. The pain is monitored by a visual analogue scale (0–10) on the first, the third and the tenth day of therapy. Data analysis: descriptive statistics and repeated measures ANOVA.

Results: Four women and 3 men were treated. The average age of the patients was 67 ± 8 , the average duration of symptoms 3 ± 2 years. Repeated measures ANOVA were used to compare the intensities of pain at the beginning, on the third day and at the end of acupuncture treatment. Mean and SD of pain at the start of treatment was: 9.31 ± 0.71 , on the third day of treatment: 3.97 ± 0.78 and at the end of treatment 0.55 ± 0.57 . It was found out that acupuncture significantly influenced the intensity of pain during the treatment time, Wilks' $\lambda = 0.005$, $F(2,27) = 2659.14$, $p < 0.0005$, $\eta^2 = 0.75$.

Conclusions: In our group of patients with trigeminal neuralgia, the pain was significantly reduced during treatment with acupuncture. The acupuncture has proven to be a successful additional method of treatment of pain in the patients with trigeminal neuralgia who reported pain despite medical therapy.

Key words: trigeminal neuralgia, acupuncture, pain, treatment

PHYSICAL MEDICINE AND REHABILITATION MODEL AT PSYCHIATRIC CLINIC

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Introduction: The recent finding confirms consistency of data that exercise reduces mental strain and depression and the as a important part of rehabilitation reduces fatigue, depression, increases cardiorespiratory fitness and physical functioning, improves quality of life of patients with different chronic disease. Traditional treatments for mental disorders have primarily included psychotherapy and pharmacotherapy which is not effective and may have side effects. Novel data including increased central norepinephrine neurotransmission, serotonin synthesis and metabolism and b-endorphins intermediate with possible mechanism of the clinical effectiveness of exercise treatment of depression and anxiety disorders. The current data indicate that expression of 5-HT₂CR mRNA in discrete brain sites is sensitive to physical activity, which reduces anxiety and depression produced with mechanism of 5-HT₂CR activation. Abnormal brain-derived neurotrophic factor (BDNF) signaling seems to have a central role in the course and development of various neurological and psychiatric disorders. Brain-derived neurotrophic factor and glial cell line-derived neurotrophic factor (GDNF) have a central role for the positive effects of exercise on synaptic and cognitive plasticity. **Purpose:** To suggest possible physical medicine and rehabilitation model in traditional psychiatry rehabilitation concept

Materials and methods: Data analyse of the research studies and reviews of the literature available on the NLM PubMed, Medline, Current Contents databases and the first results of sistematically performed physical rehabilitation tretament (PRT) of inpatient patients in Psychiatry Clinic of Clinical Center of Serbia.

Results: After analysing all data we may sugest three possible theraputic target group for PRT: First conceptual group of patients with neurodegenerative, musculoskeletal, oncology or other chronic disease combine with mental disorder. This is closest to traditional role of rehabilitation, which aim is whole functional restoration. Second target group consists of psychiatric patients with no additional serious disorders. Third group is where physical rehabilitation especially exercise may intervent as preventive tool, especially in person with genetic risk of development mental disease. In a period of six months of evaluation physical medicine rehabilitation model in Psychiatry clinic, all 46 patients who performed rehabilitation treatment were regruted from group one- neu rodegenerative, musculoskeletal and oncology disease. Formal communication between physical medicine rehabilitation team and psychiatry team is at the higher level. First results are promising. Rehabilitation program included various sorts of therapy: kinesiotherapy, balance, postural and gait rehabilitation, physical agents combined with psychiatric treatment and performed each day of hospitalization. It was flexible, individualised traetment enabling each person to progress at their own rate.

Conclusion: Our results suggests the need of further fully integrated approach of physical medicine rehabilitation and neuropsychiatry treatment as the future best solution for patient with mental disorders.

Key words: physical medicine, mental disorders, rehabilitation model

PAIN MANAGEMENT IN PATIENTS FOLLOWING LIMB AMPUTATION

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Introduction: Pain is a complex problem in patients following limb amputation. A number of entities have been described in literature and approved in practice in connection with types of pain, its causes, possible complications and applicable methods of medication therapy, as well as physical methods, psychotherapeutic and other therapeutic methods.

Materials and methods: Epidemiological study of pain conditions in lower limb amputees who were hospitalized in the Specialized Hospital for Rehabilitation and Orthopedic Prosthetics in Belgrade during the first three months of 2013. We used The Amputation Pain Questionnaire that was developed in our hospital. We recorded type of pain, its duration, intensity, frequency, type of medication and its effects in preprosthetic and prosthetic phase of the primary prosthetic rehabilitation. Methods of parametric and nonparametric statistics and statistical data processing were used.

Results: Thirty five lower-limb amputees completed the Amputation Pain Questionnaire. For 25 persons vascular disease was the cause of amputation and for 10 it was trauma. Age was 59,3 +/-12,2, Gender- 22 male, 13 female, 24 transfemoral and 11 transtibial level, Functional level(Narang) 5,2, comorbidity-20 HTA, 15 cardiac disorder, 2 pulmonal, 15 degenerative arthritis, 4 neuropathy. In preprosthetic part of rehabilitation there were 20 patients and in prosthetic 15. 31 persons had phantom limb sensations, 15 phantom limb pain (VAS-5,3), 10 residual limb pain (VAS-4,2), 10 prosthetic pain (VAS 2,3), 7 pain caused by another disease (VAS 6,2). Therapy that they had: drugs-12, kinesiotherapy- 35, physical therapy(electro, mecano, foto)-15, psychotherapy-5, another methods of therapy(desensitisation)-19. Our findings match the ones from the literature.

Conclusions: Every amputee has at least some kind of pain in preprosthetic preparation and prosthetic phase. Our experience confirmed that pain is one of the factors which influence the course and outcome of prosthetic rehabilitation. Thus, it is necessary to do an adequate review, apply numerous therapeutic methods and continuous control in order to achieve a higher functional level of an amputee.

Key words : Pain, amputation, prosthetic rehabilitation, therapy

THE ROLE OF ULTRASOUND FOR DETECTING ANKLE SYNOVITIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction: Clinical examination is difficult in patient with extraarticular swelling (subcutaneous oedema or tenosynovitis), obese patients and early arthritis. Ultrasound (US) allows visualisation of joint cavity widening due to synovial thickening and effusion. Early identification and suppression of synovitis limits the progression of the disease improving the long term prognosis. Objective of the study is to examine the significance of US in detecting ankle synovitis versus clinical examination in patient with rheumatoid arthritis (RA).

Materials and methods: 37 consecutive patients (23 female, 12 male), mean age 51 ± 12.6 , disease duration 6.1 ± 3.2 years, with RA (ACR criteria), and painful ankle joint were evaluated (talocalcaneal, talonavicular and talocrural joint). Clinical assessment consisted of joint tenderness and swelling detection. US examination consisted of synovial detection (synovial fluid or hypertrophy, using OMERACT definition) of talocrural, talocalcaneal and talonavicular joints. US examination were performed using a Voluson equipped with two linear probes 7.5-10 MHz and 10-14 MHz. US examination and clinical assessment were performed by two independent investigators at the same day, blinded to each other. The statistical analyses were performed using MedCalc for Windows XP. Interobserver agreement was calculated by kappa(k) statistic unweighted for dichotomous scoring e.g. presence/absence of synovitis).

Results: From the total of 74 joints, in 56.4% (42) joints, findings were the same, in 43.6% (32) joints were different. 36 joints were clinically inflamed, of which US detected synovitis in 27. From the rest of 38 joints, which were not clinically inflamed, US detected synovitis in 17. k value of US correlation with clinical examination was 0.301 showing fair agreement.

Conclusions: US showed to be more sensitive than clinical examination in detection of joint inflammation, tendon sheath effusion, extraarticular swelling and small synovitis in patients with RA.

Key words: ultrasonography, rheumatoid arthritis, ankle

INFLUENCE OF BALNEOPHYSICIAN THERAPY ON ACTIVITY AND FUNCTIONAL CAPACITY IN PATIENTS WITH SY CERVICALE

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Introduction: Balneophysician therapy is an important part of treatment for patients with sy cervicale.

Objective: To determine the influence of balneophysician therapy has a therapeutic effect on patients with sy cervicale.

Methods: A prospective clinical study included 50 patients. They were in the rehabilitation treatment in Atomic spa for three weeks. Treatment consisted hydrotherapy in , calcium-magnesium, hydrocarbon, oligomineral, hypothermia water (29°C), kinesitherapy, electrotherapy, magnetic therapy and lasertherapy. Used the following parameters before and after the completion of treatment: range of motion in the cervical spina (flexion and extension, rotation) HAQ index and VAS (scale from 0 - 100mm).

Results: 50 patients with sy cervical, 41 (82%) women and 9 (18%) men, mean age 62.54 ± 10.80 years, and the average duration of illness was 11.64 ± 7.86 years.

Flexion before and after treatment was, right (29.40 ± 8.18 vs 34.90 ± 6.66) and left (26.24 ± 7.09 vs 33.30 ± 5.58). Rotation to the right, before and after treatment was 55.70 ± 10.78 vs 62.40 ± 8.87 and rotation to the left 51.40 ± 9.47 vs 59.40 ± 8.36 . Distance between the chin and the sternum was 6.10 ± 2.27 before and 4.16 ± 2.10 after rehabilitation. HAQ scor before rehabilitation was 0.29 ± 0.27 and after that 0.20 ± 0.19 . VAS scale was 69.40 ± 14.48 before and 77.60 ± 13.93 after balneophysical treatment. Statistical analysis, Student t test, it is determined that the obtained difference value in cervical flexion before and after treatment, and left and right ,was statistically significant ($P < 0.05$), while the difference in values of the rotation, HAQ scor and VAS scale was statistically highly significant ($P < 0.001$).

Conclusion: The data analysis showed that the use of Atomic spa rehabilitation therapy for three weeks in patients with sy cervicale beneficial effect on reducing pain, increasing mobility and functionality that facilitate the activities of daily living.

Key words: balneophysician therapy, sy cervical

THE EFFECTS OF BALNEO FACTORS IN BANJA KOVILJAČA ON THE FUNCTIONAL DISABILITY AND QUALITY OF LIFE IN PATIENTS WITH LUMBAR DISCUS HERNIA

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Introduction: Clinically manifested discus hernia is a condition that can significantly change the life of an individual by disturbing one's everyday routines, changing one's role in a family, reducing work capabilities, and thus presenting a major health and socio-economical issue.

Aim: Test the effects of sulphuric water and peloid (mud packs) in Banja Koviljaca on the functional disability and quality of life in patients with lumbar discus hernia.

Materials and methods: Research was performed as a prospective study on 60 patients rehabilitated due to a lumbar discus hernia in sub-acute and chronic phase of the illness. The patients were divided into two groups of 30 patients – experimental and control. In the experimental group, peloid and sulphuric water of Banja Koviljaca were used, and in the control group, classical physical modalities were used. The estimate of the functional disability and quality of life of the patient was done using *The Oswestry Low Back Pain Disability Questionnaire* which was completed by the examinees themselves.

Results: By cross-analysis, a more favorable therapeutic effect was determined in the experimental group, that is, a significant reduction in drug intake (NSAIL/analgesics) was noticed in the post-rehabilitation period than in the control group. Based on the statistical analysis of the obtained values, a significant reduction in the Oswestry score in the post-rehabilitation period was noticed in both groups, however, a more significant improvement of the functional ability and quality of life was achieved in the experimental group, which improved from a severe disability zone to a moderate disability zone.

Conclusion: The results obtained in this research are a recommendation for the application of a complex spa treatment in patients with lumbar discus hernia, since it significantly contributes to a more successful outcome of non-surgical treatment methods, without any additional financial costs and excluding the risks connected to surgical treatment methods, and it also contributes to an improvement of the general functionality and quality of life of a patient.

Keywords: balneotherapy, peloid, sulphuric water, lumbar discus hernia

THERMOMINERAL WATER “SERBIAN SELTERS” IN REHABILITATION TREATMENT OF PATIENTS WITH REUMATHOID ARTHRITIS

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INTRODUCTION: The most important natural factor, which is used for therapeutical purposes is thermomineral water. Rheumatoid arthritis (RA) is an autoimmune disease that causes chronic inflammation of the joints. The aim of the work is to test and show satisfactory effects of natural factors in rehabilitation for patients with RA.

DESIGN: Retrospective of analyses had been for 40 patients, 34 female and 6 male, average age 60,7. Patients were divided in two groups, and cured in period of 15 days in rehabilitation centre.

MATERIAL AND METHODS: In both groups basic therapies were kinesytherapy and electrotherapy with analgesic effects “DD”. Only experimental group had specific procedures with thermomineral water, which due to Quentin’s classification is in the group of alcal muriotic carbondioxide hyperterms.

The temperature of water used in local application (hands) was 33 - 36 C° Followed parametres, were measured two times before and after the therapy: Analitic muscular test (MMT), scope movement of joints hands, scale of pain (VAS). Laboratory analyses, Health Assessment Questionnaire (HAQ), statistically significant $p < 0,05$., Wilcoxon,s test, Kolmogorov-Smirnov test, programmes SPSS and MS Excel.

RESULTS: Results are analysed with descriptive statistic method, and due to statistic analysing of facts. Before and after therapy according to MMT, there was no statistically significant association between the groups. $p > 0.05$ ($p = 0.329$), $p > 0.05$ ($p = 0.477$). Scope movement of hands joints: there is statistically significant association between the groups ($p = 0,00$). There was an improvement in dorsal flection only in experimental group. Labaratory analyses: there was no statistically significant association between the groups ($p > 0,05$). HAQ score: ($p > 0.05$), $p = 0.329$ before therapy, there was no statistically significant association between the groups. HAQ score in both groups after therapy the statistics improvement of score evident HAQ experimental group (0.195), $p = 0.00$., second group HAQ score (0.17), $p = 0.00$. In experimental group there was evident reduction of pain (VAS), after therapy, comparing with the control group ($p < 0,05$), $p = 0,001$.(Wilcoxon,s test, and Kolmogorov - Smirnov test)

CONCLUSIONS: Thermomineral water in combination physical therapy has positive effects on subjective discomfort and funcional status of patients with RA.

KEY WORDS: thermomineral water “Serbian Selters”, reumathoid arthritis, physical therapy

**BALNEOPHYSICAL THERAPY INFLUENCE ON CLINICAL AND BIOLOGICAL
PARAMETERS OF DISEASE ACTIVITY AND HEALTH CONDITION IN THE PATIENTS WITH
RHEUMATOID ARTHRITIS**

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Introduction: Rheumatoid arthritis is inflammatory systemic (organ nonspecific), autoimmune disease of unknown cause with chronic course that leads to progressive destruction of articular and periarticular structures. The early DMARDs therapy became standard of care that slows structural joint damage and improves quality of life. Optimal care of rheumatoid arthritis involves the use of balneophysical therapy which improves functional condition and quality of life in rheumatoid arthritis patients due to its favorable effects on clinical and biological disease activity.

Materials and methods: The aim of this study was to evaluate the influence of balneophysical therapy on disease activity and functional condition of patients with rheumatoid arthritis. The research included 33 patients: 29 (87,87%) woman and 4 (12,3 %) man, average age 64,78 (ranges 40 - 81), mean duration of illness was 22,06 years (ranges 8 - 30). They were diagnosed with rheumatoid arthritis based on American College of Rheumatology 1987 revised criteria at Rheumatology and Allergy Center of Clinical Center of Kragujevac. Between October 2010 and February 2013 patients were referred for 28 days to the Specialized Hospital for Rehabilitation Bukovička Banja of Aranđelovac. They underwent treatment with mineral peloid therapy (36°C, to 1 hour) and different forms of hydrotherapy such as general and local baths, underwater shower massage, aquatic exercises in mineral pool (30 min.), electrotherapy (dyadynamic currents: 3 + - CP and 3 + - LP, interferent currents 1-100 Hz for 15 min.), magnetotherapy (10 mT 50 Hz 30 min), kinesiotherapy (group or individual). Disease-modifying Anti-rheumatic Drugs dosage and glucocorticoids drugs dosage were stable during the rehabilitation period. Mineral water of Bukovička Banja is sodium - calcium - hydrocarbonat, carbonic acid, homeothermal (34°C). The assessment of disease activity was performed at beginning and after the rehabilitation calculating DAS 28 (Disease Activity Score). Majority of patients (84,92 %) had moderate disease activity DAS 28 (3,2–5,1).

Results: Results of rehabilitation are objectified following measurement: length of morning stiffness, number of painful joints, number of swollen joints, VAS (visual analog scale) and sedimentation rate (mm/h). Statistical analysis was performed by descriptive methods (mean, SD, SE) while significance was tested using Student's t-test. At baseline the mean value of DAS 28 score was 4,86 while at the end point the mean value of DAS score was 4,06. The mean value of decrease in DAS 28 was 0,8. According to the DAS- based EULAR response criteria, a decrease in DAS 28 score of 0,6 -1,2 indicate a good treatment response.

Conclusions: A well - conceived balneophysical treatment is effective in the patients with moderate active rheumatoid arthritis. Balneophysical therapy combined with pharmacological therapy has beneficial effects on disease activity and quality of life.

Key words: rheumatoid arthritis, rehabilitation, DAS28

PAIN THERAPY IN PHYSICAL MEDICINE AND REHABILITATION

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Pain can be experienced in almost any location in the body, easily localized or generalized. The pain may be acute or chronic, and may range from a fleeting moment of sharp pain to lifelong and debilitating pain. Pain relieving drugs may be suggested or prescribed for any kind of pain, and patients run the risk of becoming addicted to many of the drugs that may be prescribed. Not all prescription painkillers are potentially habit -forming, it depends of kind of prescribed drugs, the duration of therapy and its dosage. Specific personality characteristics are also important for addiction susceptibility. Young people, especially those with psychic trauma and adults who have already abused other substances are more likely to fall victim to opioid addiction. Studies show that people who take their medications as directed and are regularly monitored by their physician are at the lowest risk for developing painkiller addiction, or having other associated complications. Key words: pain, painkillers, addiction, prevention

HYPERBARIC OXYGENATION EFFECTS ON PROSTHETIC REHABILITATION OF PATIENTS WITH UNILATERAL LOWER LIMB AMPUTATION

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Objectives: Hyperbaric oxygenation (HBO) has been proven to be very effective adjuvant procedure in the multidisciplinary approach to the treatment of gas gangrene, diabetic ulcers, other forms of chronic unhealing wounds and soft tissue necrosis. However, considering the mechanism of action of this method, it is clear that its therapeutic role does not end here. The aim of our study was to investigate the effects of HBO on the prosthetic rehabilitation of patients with unilateral lower limb amputation.

Methods: Sixty patients (age 61.6 ± 11.5 , male 30, female 30) with unilateral lower limb amputation were randomly divided into two groups (30 patients in each group): experimental group received HBO treatment (five times a week, for 5 weeks, pressure 2.5 ATA for 90 minutes, in multiple chamber), and control group. Both groups were subjected to the assessment of functional competence of amputated stump, by using LCI test and Narang's score.

Results: At the beginning of the study there were no statistically significant difference between the values of LCI and Narang's score among these two groups. After the period of prosthetic rehabilitation in both groups significantly higher LCI scores were registered. Lower Narang's score were also registered in both groups. However 5 weeks later, LCI scores were statistically significantly higher in experimental group compared to the control, and at the same time values of Narang's scores were statistically significantly lower in the group of patients that were exposed to HBO.

Conclusions: Our results clearly show that in case of a relatively homogeneous group of patients, standard therapy and prosthetic rehabilitation with adjunct of HBO provided better functional capacity of these patients. These findings highlight the increasing validity of this procedure after limb amputation, which should be confirmed by further research in multicenter studies involving a larger number of respondents.

Keywords: hyperbaric oxygenation, prosthetic rehabilitation, amputation

VITAMIN D STATUS IN MEN WITH LOW BONE MINERAL DENSITY AND OSTEOPOROTIC FRACTURES

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Introduction: Osteoporosis is a well - recognized problem in older women. There has been insufficient awareness among both the public and the medical profession that osteoporosis is also a common problem in older men. Vitamin D, its active metabolites and analogues represent the group of compounds with numerous functions within the organism. The primary role of vitamin D is in the metabolism of phosphorus and calcium. The aim of study was to determine and compare prevalence of vitamin D inadequacy in male population with low bone mineral density (BMD) and presence of osteoporotic fractures.

Materials and methods: Our study was performed from November 2010 to November 2011 and included 122, 65,2 ± 15,8 years old men referred to Railway Healthcare Center in Belgrade for DXA lumbar spine and hip scan. Low bone mineral density was detected in all our participants (average BMD on lumbar spine was 0,732 ± 0,243, on femoral neck 0,614 ± 0,231 and total hip 0,756 ± 0,234). Following the ISCD protocol Vertebral Fracture Assessment (VFA) was performed in all participants during same visit, on Hologic Discovery C device, in aim to detect vertebral fractures. Vertebral bodies were analyzed by semiquantitative Genant method and Grades II and III considered in study. In all participants serum level of 25 - hydroxyvitamin D (25O HD) were measured. We used 75 nmol/l as the cut off point defining vitamin D inadequacy. Vitamin D status was categorized in three groups: normal (25O HD > 75 nmol/l), insufficiency (25 nmol/l < 25O HD < 75 nmol/l) and deficiency (25O HD < 25 nmol/l). All participants were done Ca, Ca⁺⁺, P, ALP, PTH, vit. D in blood and Ca, P in 24 h urine. Causes of secondary osteoporosis were excluded. The results were interpreted according to the current definition of osteoporosis. In statistical analysis we used descriptive statistic and Student T- test.

Results: Vitamin D inadequacy was observed on 108 (88,52 %) of all the patients: 74 (68,52 %) had insufficiency and 34 (31,48 %) had deficiency. 122 participants were divided into two groups. Group I included 60 patients without previous fracture and Group II with 62 patients with previous fracture. Average value of 25OHD in Group I was 52,83 ± 24,63 and in Group II was 45,7 ± 16,29. This difference is considered to be statistically significant (p < 0,05). Patients from Group II were divided into two groups: Group II A, 30 patients with vertebral fractures and Group II B, 32 patients with nonvertebral fractures (forearm – 24 (75 %), hip – 5 (15,62 %), humerus – 3 (9,38 %)). The serum level of 25O HD in Group II A was 40,39 ± 14,21 and in Group II B was 50,36 ± 18,7. This difference is considered to be very statistically significant (p = 0,01). In Group I 9 (15 %) patients, in Group II A 16 (53,33 %) and in Group II B 9 (28,13 %) were older than 70 years.

Conclusions: This study confirms that vitamin D inadequacy is highly prevalent in Serbian male population with low bone density. Adequate vitamin D supplementation may significantly improve bone health in this population.

Key words: men, vitamin D, bone mineral density, fractures

**USING THE OXFORD SHOULDER SCORE IN ASSESSMENT OF QUALITY OF LIFE AND
EVALUATION OF CLINICAL CONDITION OF SHOULDER JOINT DISORDERS**

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Introduction: The Oxford Shoulder Score is used for assessing and measuring patients' quality of life as well as the functionality of shoulder joint within different pathological conditions such as rotator cuff disorder, shoulder joint injury, postoperative condition etc. The main aim of this effort was to assess whether The Oxford Shoulder can be effectively used to monitor rehabilitation process in addition to the final treatment outcome as well as its potential for using in assessing patients' capability for everyday activities and work activities too.

Methodology and materials: A total of 25 patients who had been selected on the bases of anamnesis and clinical findings were included in this study. The medical history was obtained during the period January 2013-May 2013 from Institute of Orthopedics, Physical Medicine and Rehabilitation *Dr Miroslav Zotovic*, Banja Luka. The *standard* questionnaire of the Oxford Shoulder Score was used along with measuring of sick shoulder range movement prior the therapy and subsequently to 10 therapy procedures. Descriptive statistic and analysis were done by a non-parametric Mann-Whitney's test.

Results: Statistically significant progress of quality of life and clinical condition after the therapy was confirmed - within risk level of 5% (evaluated by the Oxford Shoulder Score questionnaire) in all treated patients with shoulder joint disorder.

Conclusions: The Oxford Shoulder Score questionnaire has considerable contribution in assessment of functionality of suffering shoulder joint. It is also an indicator for evaluation of medical treatment and rehabilitation therapy that are performed after different pathological conditions, and it is necessary to be used in all medical clinics trained to accomplish physical therapy.

Keywords: Oxford Shoulder Score, Shoulder disorder

SARCOPENIA AND VERTEBRAL FRAGILITY FRACTURE

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Introduction: Increased life expectancy is associated with a greater frailty of elderly people and a higher prevalence of chronic and degenerative diseases, including osteoporosis. In Italy there is an high incidence of fragility fractures (1). Sarcopenia was significantly associated with osteoporosis in a large sample of women following a hip fragility fracture (2). Prevalence of sarcopenia in patients with vertebral fractures is largely unknown. The aim of our study is to investigate the frequency of sarcopenia in women who sustained vertebral fragility fractures.

Materials and methods: In this pilot retrospective study we evaluated data of white women that referred to a Physical Medicine and Rehabilitation outpatients' Department with a diagnosis of osteoporotic vertebral fracture. In this study we included women of 55 years old or older. Women with secondary osteoporosis or pathological vertebral fractures were excluded from the evaluation. Dual-Energy X-Ray Absorptiometry (DXA) was used to measure whole and regional body composition. Appendicular lean mass (aLM) was calculated as the sum of lean mass (LM) in arms and legs. We calculated the skeletal muscle mass (SMI) index (aLM/height squared), and we measured bone mineral density (BMD) and T-scores by DXA scan at total-body and at femoral neck. Participants were divided according to the number of vertebral fractures (single or multiple fractures).

Results: A total of 67 women were included. Thirty-five women (52.23%) had a vertebral fracture. Of them 8 (22.85%) were sarcopenic. Thirty-two women (47.76%) had multiple vertebral fractures. Of them 14 (43.75) were sarcopenic. Our results suggest that sarcopenia is common among osteoporotic women increasing along with the number of vertebral fragility fractures.

Conclusions: The results of our study suggest that sarcopenia is common among osteoporotic women, increasing along with the number of vertebral fragility fractures. Further studies are needed to demonstrate a correlation between sarcopenia and osteoporosis both in terms of physiopathological and clinical aspects. Increasing the knowledge of these conditions would improve the therapeutic approach that counteract the onset of disabling complications.

Key words: Sarcopenia, Vertebral fractures, Osteoporosis, Dual-Energy X-Ray Absorptiometry

ANATOMICAL DAMAGE OF WRISTS AND BONE MINERAL DENSITY IN FEMALE PATIENTS SUFFERING FROM RHEUMATOID ARTHRITIS

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Introduction. Rheumatoid Arthritis (RA) is a systemic, autoimmune, chronic, inflammatory disease, which is, in its clinical picture, most clearly reflected on joints- juxtaarticulare and systems osteoporosis.

The objective of the paper. To study the level of anatomical damage on wrists and bone mineral density in female patients suffering from RA, and then to study as to whether there is a correlation between these changes.

Materials and methods. The cross-sectional study covered 100 female patients suffering from RA, who were treated at IV and VI Departments of the Institute of Rheumatology from November 2006 to November 2007. On all the female patients, osteodensitometry was performed in the first year after the diagnosis had been made and X-ray images of wrists were also made. The level of anatomical damage on wrists was monitored and assessed applying the Larsen method. A higher value of the Larsen index indicated a poorer condition of the analyzed wrists. Thereafter, a correlation was made between the values of the T score and the values of the Larsen index.

Results. In the studied sample of female patients, the total value of the Larsen score was 40.46 ± 18.38 . By stratification of the values of the scores for the left and the right wrist, it was noticed that the value of the left wrist Larsen score was 20.11 ± 9.27 and, of the right one, it was 20.35 ± 9.44 , without a statistically significant difference ($t = -0.696$, $p = 0.488$).

The total value of the Larsen index was 2.05 ± 1.02 . By stratification of the values of the scores for the left and the right wrist, it was noticed that the value of the left wrist Larsen index was 2.23 ± 1.03 and, of the right one, it was 2.26 ± 1.05 . Bone mineral density was measured in all the female patients and, in 32 (32%), osteoporosis was established (the T-score -3.35 ± 1.35). From the moment of verification of osteoporosis, 3.41 ± 1.80 years (from 1 to 5 years) passed on average. In this study, the level of wrist damage in female patients suffering from rheumatoid arthritis was also studied in relation to osteoporosis. This type of analysis demonstrated that there was a statistically significantly higher level of anatomical damage in the group of female patients suffering from osteoporosis as compared to the female patients without osteoporosis ($\chi^2 = 11.355$, $p = 0.045$).

Conclusion. Osteoporosis was diagnosed in 32 female patients suffering from rheumatoid arthritis. The Larsen index is statistically highly significantly correlated with the values of the T score.

**BONE METABOLISM OF MALE HYPOGONADIC PATIENTS TREATED WITH
TESTOSTERONE REPLACEMENT THERAPY (TRT)**

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Introduction: Male hypogonadism is a clinical syndrome characterized by low levels of testosterone associated with infertility, changes in mood, fatigue and anger, decrease in muscle mass and strength, loss of bone mass. Recently the attention has been focused on a possible reciprocal regulation bone - gonads, in particular on a regulation of male fertility by the skeleton through the action of osteocalcin.

The aim of our study is to evaluate in male patients with primary and secondary hypogonadism the interaction between the endocrine - metabolic and musculoskeletal functions, the alterations of body functions and structures related to movement, any restriction of social participation and the consequent deterioration in the quality of life.

Materials and methods: This observational study was conducted in collaboration with the Department of Clinical and Experimental Internistics of our University. All patients with a diagnosis of hypogonadism, that were sent to our observation, were receiving a pharmacological treatment with testosterone. They underwent a DXA examination, a physical examination including the assessment of muscle strength (MMT scale), presence and intensity of any kind of pain with the Brief Pain Inventory (BPI), disability (Barthel Index), and quality of life with the Short Form -12 (SF - 12).

Results: Up to date, 51 male patients aged between 17 and 55 years were evaluated; 17 patients were overweight and 5 were obese. Nine patients had a diagnosis of Klinefelter syndrome, 32 Kallmann syndrome, 8 idiopathic hypogonadotrophic hypogonadism (IHH), 1 multiple pituitary deficit and 1 a primary hypogonadism after orchiectomy for bilateral testicular cancer. At the DXA examination 15 patients were osteopenic (T-score value between -1 and -2.5) and 3 were osteoporotic (T-score < -2.5). Thirty patients were practicing a sport. Fifteen patients reported musculoskeletal pain of mild-moderate intensity (BPI range 2.71 - 4.57), 7 patients had a mild muscle weakness against resistance (MMT = 4/5). One patient had changes in activity and social participation (Barthel Index = 75/100) and in the quality of life (PCS = 38,30; MCS = 41,56).

Conclusions: Testosterone replacement therapy (TRT) in these patients can restore sexual function, lead to an increase of energy, sex drive and sense of well - being, but also prevent muscular atrophy and bone loss. Hypogonadism is a complex clinical syndrome which comprises symptoms and signs as well as testosterone deficiency; a multi-dimensional diagnostic evaluation that includes the parameters of the muscular-skeletal metabolism, as proposed in our protocol evaluation, might lead to a more satisfactory therapeutic perspective and then to a possible improvement of quality of life of these patients.

Key words: hypogonadism, testosterone, DXA

THE INFLUENCE OF THE DURATION OF THE DISEASE, AGE AND SEX ON FATIGUE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid arthritis (RA) is a chronic, systemic, inflammatory disorder of unknown etiology. Active RA leads to impairment in physical function, limiting activities and decreasing QOL. **Objective:** The aim of this study is to estimate the influence of the duration of the disease, age and sex on fatigue in the patients with rheumatoid arthritis.

Materials and Methods: This research included 66 RA patients, according to ACR criteria. Fatigue was rated visual analogue scale (VAS), the SF-36 vitality scale, questionnaire Facit Fatigue Scale (FFS) and the Fatigue Severity Scale questionnaire (FSS). For statistical analysis of the data used the analysis of variance (ANOVA), t-test.

Results: Of the 66 patients were 51 female and 15 male. Fatigue is present in patients of both sexes, was more pronounced in women, evaluated all the questionnaires but without statistical significance. In relation to age, patients were divided into three groups. There is a pronounced fatigue in older patients evaluated all the questionnaires, although without statistical significance. In relation to duration of the disease, were divided into three groups. The patients with disease duration longer than 10 years had the highest average value of fatigue VAS scale 65.90 ± 21.46 compared to group with duration of disease is 6-10 years, 46.75 ± 17.00 and compared to group with duration of disease 1 to 5 years 47.13 ± 18.53 in the presence of high-statistically significance $p = 0.001$. The patients with disease duration longer than 10 years had the worst average value of scale vitality questionnaire SF36 32.33 ± 20.66 compared with the patients in duration of disease is 6-10 years, 46.25 ± 16.25 and compared to group with duration of disease is 1 to 5 years 46.04 ± 12.15 with the existence of high-statistically significance $p = 0.000$. The patients with disease duration longer than 10 years had the worst average value of FSS questionnaires 44.30 ± 15.32 compared to those in whom the disease is 6-10 years 30.67 ± 8.21 and compared to those in whom the disease lasts up to 5 years 29.21 ± 10.81 in the presence of high-statistically significance $p = 0.008$. The patients with disease duration longer than 10 years had the worst average value of the questionnaire FFS 19.10 ± 9.36 compared to group with duration of disease is 6-10 years 28.67 ± 8.23 and compared to group with duration 1-5 years 29.63 ± 7.61 in the presence of high-statistically significance $p = 0.000$.

Conclusions: All patients with RA had fatigue. Fatigue is stronger in women and older patients but without statistical significance. Disease duration longer than 10 years leads to severe degree of fatigue in compare to patients with duration of the disease is 6-10 and 1-5 year with statistically significant.

CHANGES OF THE GAIT CYCLE IN RELATION TO GENDER, WEIGHT AND HEIGHT

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Introduction: It's well known that changes in weight and gender, determining differences in terms of muscle strength, muscle power and redistribution of fat tissue, influence the quality of the walking. Up to date, there is no scientific evidence supporting this thesis; therefore the aim of our study is to quantify the relationship between gender, height, weight and stepping parameters. **Materials and methods:** We examined four walking variables: swing, rolling, duration and frequency of the step in a group of students that attend a high school in Naples. As evaluation tool, we used a mobile inertial sensor G walk® of BTS equipped with Bluetooth support, positioned at level of L5 and connected to a PC for processing data. The data were subsequently crossed with the anthropometric variables gender, height and weight.

Results: One hundred and sixty-two students were enrolled; 72 females and 90 males with mean age of 16.30 years (min 14 max 19). We divided subjects into three classes: underweight (<5°percentile), normal weight (5°- 85°percentile), overweight (>95°percentile). The students who were underweight were 39 (28 females and 11 males), 88 were normal - weight (38 females and 50 males) and 35 overweight (7 females and 28 males). We have not detect significant differences, in both males and females, regarding the percentage of rolling, the duration and the frequency of the gait cycle, in each of the three classes. There was a progressive decrease in the percentage of oscillation between the first, second and third class in both genders. In females there was a value of 36.02% in the first class, of 35,27% in the second and of 35.11% in the third class, while in males the percentage of swing was 36.69 in the first class, 36.40% in the second and 36.13% the third class. **Conclusions:** There aren't statistically significant differences between two genders and three classes regarding the percentage of rolling, the duration and cadence of the step. However, we have noticed a decrease in the percentage of swing and an increase of ratio weight/height.

Key words: gait cycle, growth percentiles

THE ROLE OF THE EARLY REHABILITATION AFTER TOTAL KNEE ARTHROPLASTY IN RHEUMATOID ARTHRITIS AND OSTEOARTHRITIS

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In the case of rheumatoid arthritis and osteoarthritis total knee arthroplasty represents the most frequently applied surgical treatment.

The aim of this research was to evaluate the results of rehabilitation in patient with knee arthroplasty in order to improve the functional status and the quality of their life.

102 patients with an implanted total knee endoprosthesis were analysed - 38 of them with rheumatoid arthritis and 64 patients with osteoarthritis. The rehabilitation treatment was applied for a period of three weeks. The tests were used to cover all objective and subjective parameters: before surgical intervention, and during control examinations over a period of three, six and twelve months after the surgical intervention. The pain was tested by means of the visual analogue scale. In order to determine the functional status of patients with rheumatoid arthritis the Health Assessment Questionnaire was used, whereas the Lequesne's index was applied in patients with osteoarthritis. The quality of life in both test groups was assessed by a modified SF 36 (Short Form Health Survey).

In both test groups the functional status in RA patients was raised by an average of 1.99 to 1.87 ($p < 0,005$) and in OA patients the functional status at the beginning of the rehabilitation was 13 points on average and in the end 7.89 points ($p < 0,005$). As the result, the patients could carry out their everyday activities with more ease, *which* improved their quality of life (in patients with rheumatoid arthritis $t=22,86$, $p > 0,05$; in patients with osteoarthritis $t=29.07$, $p<0,05$).

To conclude, early rehabilitation after knee arthroplasty significantly improves the functional status and quality of life in patients with rheumatoid arthritis and osteoarthritis.

Key words: rehabilitation, rheumatoid arthritis, osteoarthritis, functional indeks, quality of life.

THE PHYSIOLOGICAL COST INDEX: IS THERE A CORRELATION WITH THE ENERGY COST OF WALKING IN TRANS - TIBIAL AMPUTEES? PRELIMINARY DATAStefano Brunelli¹, Laurini A², Contini BG², Delussu AS¹ Trallesi M¹, Foti C²¹Fondazione Santa Lucia, Scientific Institute for Research Hospitalization and Health Care, Rome, ²Physical and Rehabilitation Medicine, Tor Vergata University, Rome, Italy
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Introduction: Motor impairments frequently result in increased walking expenditure. This may limit the independence and community life of individuals with motor disorders. Although oxygen consumption ($\dot{V}O_2$) measurements are the primary choice for assessing energy expenditure, they are cumbersome, the instrumentation needed is expensive, and the methodology requires trained personnel. Thus, for estimating energy expenditure, other methods have been used instead, including the Physiological Cost Index (PCI). As reported in the literature, the PCI is an easy and cheap way to evaluate the $\dot{V}O_2$ and obtain an index of energy expenditure and energy cost in individuals, in relation to their own heart rate during exercise. Several authors have conducted studies about the use and properties of the PCI, in different patients with different ages (children, elders). Nevertheless there is still not agreement, on this topic, among the researchers. So, the aim of our study was to assess if there is a correlation between PCI and Energy Cost of Walking (ECW) in unilateral trans-tibial amputees (TTAs).

Materials and methods: To accomplish the aim of the study, unilateral traumatic TTAs, active and without comorbidities, were selected from our database. Their data refer to six minute walking tests (6MWT) on floor during 1 year observation period while using 2 different prostheses components. The TTAs conducted all 6MWTs walking at their own self selected speed. During 6MWTs $\dot{V}O_2$ and Heart Rate (HR) were collected by means of K4b² (Cosmed, Italy). The time length of 6MWT was enough to reach the steady state phase (SSP) for HR and $\dot{V}O_2$. SSP data were used to calculate ECW and PCI. The Spearman's correlation coefficient (ρ) was computed to assess the correlation between ECW and PCI. Statistical significance was set at $p < 0.01$.

Results: The involved TTAs were 7 males, mean age, weight and height were: 40.7 ± 10.1 , 174.7 ± 6.8 , 77.3 ± 15.8 respectively. The 6MWTs considered were 66; 4 TTAs failed to complete the 10 evaluations in the observation period. The PCI resulted weakly, but significantly, correlated with the ECW: $\rho = 0.373$, $p = 0.002$.

Conclusions: On the basis of our results, PCI seems to be a simple, easy and cheap method to have directions in clinical settings, where more expensive and sophisticated instruments are often lacking. Even if our data showed a correlation between ECW and PCI, the ECW still remain the gold standard; thus caution is mandatory in managing this tool. A greater sample size and a deeper data analysis is needed to better evaluate PCI usefulness in TTAs.

Key words: Lower limb amputation, walking, physiological cost index, energy cost of walking

EFFECTS OF WHOLE BODY VIBRATION ON PELVIC FLOOR MUSCLES IN HEALTHY WOMEN

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Introduction: Whole - body vibration (WBV) is a neuromuscular training method initially used in elite athletes to improve speed - strength performance. Recently it is becoming popular in health and fitness clubs as an alternative training method. There is some evidence that WBV is as efficient as physical fitness training but is also reported a case of hematuria after WBV training. There is a lack of scientific research concerning the effect of whole body vibration on the pelvic floor muscles. The aim of this randomized controlled trial is to investigate the influence of sinusoidal whole body vibration on the pelvic floor muscles in sedentary healthy women.

Materials and methods: From November to April were assessed for eligibility 95 healthy sedentary women. 63 were excluded from the study (35 subjects didn't meet the inclusion criteria; 28 declined to participate). The authors enrolled and randomized in two groups 32 subjects. In each group the subjects were standing in the squat position on a WBV platform. Pelvic floor muscle activity was assessed every 15 s by means of a manometric vaginal probe connected to a myography and neurostimulator device (MYOMED 632 - Enraf Nonius - Medimar). The evaluation session occurred for 45 s. In the experimental group the vibration energy was supplied through Galileo 2000 platform at 30 Hz with an amplitude of 4 mm. A sham platform (worthless vibration) was provided for the control group.

Results: Our data show an increasing activity of the pelvic floor muscles during the vibration session in the experimental group compared to the control group.

Conclusions: WBV seems to recruit pelvic floor muscles in healthy sedentary women. This study open to new perspectives on treatment of pelvic floor dysfunctions; however, more scientific studies of safety should be conducted, due to an increasing of popularity of the WBV platform in fitness and gym centers as a training method.

Key words: whole body vibration, pelvic floor muscles training, rehabilitation

ASSESSMENT OF FUNCTIONAL RECOVERY DURING EARLY REHABILITATION OF PATIENTS IN THE ORTHOPEDIC WARD – CONCURRENT VALIDITY OF THE A-TEST

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Introduction: The population of patients in the orthopedic ward is heterogeneous, and this is the situation in all general hospitals. Surgical treatment is followed by early rehabilitation which usually lasts a short time, only a few days. Adequate assessment of the functional recovery of patients in this period is important, not only for monitoring regaining functional ability, but also for an adequate dosage of physiotherapy and planning further rehabilitation. Simple instruments are needed to monitor the rehabilitation process, presenting the results of the work, conducting clinical studies. However, there are little tests that cover this period of rehabilitation. These tests are related to specific clinical entities: the University of Iowa Level of Assistance Scale (ILAS) was created to assess functional recovery of patients after hip and knee arthroplasty and the Cumulated Ambulation Score (CAS) is used to evaluate functional recovery in the first days after the surgical treatment of hip fractures. We designed the A-test for assessment of functional recovery during early rehabilitation of patients in the orthopedic ward. This performance based test consists of 10 items for assessing basic activities by six level ordinal scale (0-5). Total scores can range from 0 to 50, or inability to perform any activity despite the help of therapists until complete independence and safety in performing all activities. The aim of this study was to examine the A-test concurrent validity.

Materials and methods: Design: measurement-focused study. Setting: orthopedic ward, 1st-5th day of early inpatient rehabilitation. Population: 60 patients with hip osteoarthritis that underwent arthroplasty and 60 surgically treated patients with hip fracture. Methods: Concurrent validity refers to the ability of an instrument to assess the current state of the patient. The instrument is compared with the existing measurement tool (the criterion). Since the validity of the ILAS was confirmed in patients after hip and knee arthroplasty, we examined the correlation between A-test and ILAS in patients with hip osteoarthritis who underwent arthroplasty. On the other hand, the validity of the CAS has been demonstrated in patients with hip fracture, so we correlated A-test results with the results of CAS in this patient group. Data analysis: Spearman rank correlation.

Results: Strong correlation of A-test and ILAS results for patients with hip osteoarthritis, $r = -0.97$, $p = 0.000$ and A-test and CAS results for patients with hip fracture, $r = 0.91$, $p = 0.000$.

Conclusions: The A-test is simple and valid instrument for everyday evaluation of pace and degree of functional recovery during the early rehabilitation of patients surgically treated on orthopedic ward because of hip fractures and hip osteoarthritis.

Key words: hip arthroplasty, hip fracture, validity, early rehabilitation, assessment of functional recovery

COMPARISON OF ELECTRODIAGNOSTIC TESTS AND MAGNETIC RESONANCE IMAGING IN MUSCLE DENERVATION SECONDARY TO ULNAR AND MEDIAN NERVE INJURIES

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Introduction: The diagnosis of peripheral nerve injury has been traditionally based on clinical and electrodiagnostic examinations. However electrodiagnostic studies, especially needle electromyography are painful, invasive, and hard to tolerate for some patients. Also, electrodiagnostic studies could be misleading in cases with anatomic variations of the peripheral nerves. Furthermore discrepancies occur between interpretation of the electrodiagnostic studies due to the timing of the examination and physicians' experience. In recent years there has been an increasing evidence that magnetic resonance imaging (MRI) can significantly aid in the diagnosis of peripheral nerve injury and muscle denervation. The aim of this study was to determine the diagnostic utility of MRI in detecting denervated muscles in cases of focal median and ulnar nerve lesions compared to electrodiagnostic tests.

Materials and Methods: A total of 40 patients diagnosed as either median/ulnar nerve injury, carpal tunnel syndrome or ulnar entrapment neuropathy according to electrodiagnostic examinations were included in this study. Patients with signs of muscle denervation and and/or motor unit loss in needle electromyography underwent MRI evaluation. Coronal and axial fat-suppressed (FSPD) and short tau inversion recovery (STIR) sequences with 3mm slice thickness was obtained and evaluated for the existence of muscle edema.

Results: A significant association was found between both denervation and motor unit loss in needle electromyography and increased signal intensity in STIR MRI ($p=0.007$ and $p<0.001$). However when we considered denervation findings in needle electromyography as the reference parameter, the diagnostic sensitivity of MRI was found 40.9% and specificity was found 94.3%.

Conclusions: This study showed that the sensitivity of MRI in diagnosing muscle denervation is low and for this reason electrodiagnostic tests can be accepted as gold standart in diagnosing muscle denervation due to peripheral nerve injury. However, MRI may be a useful adjunct diagnostic tool in cases which electrodiagnostic tests could not be performed.

Keywords: Muscle denervation, Electromyography, Magnetic resonance imaging

KACLIR TEST; A SUGGESTED ASSESSMENT METHOD AFTER ACL RECONSTRUCTION

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Introduction: Purpose of this study is to detect the value of combining surface Electromyography (sEMG) and whole body vibration (WBV), in evaluating the functional recovery of the quadriceps muscle after an anterior cruciate ligament (ACL) reconstruction, using the KACLIR (Knee Anterior Cruciate Ligament Reconstruction) test.

Materials and methods: 10 subjects were included in this study divided into 2 groups. Group I was formed by 5 patients who had unilateral ACL reconstruction at least 1 month before, while Group II was formed by 5 healthy subjects as a control group.

The measures were taken through the KACLIR test by using a sEMG, with electrodes placed at the vastus medialis and lateralis bilaterally, during knee extension without resistance and during whole body vibration (WBV). The results were elaborated with the KACLIR App, an Excel file that allows visualizing the data of the test of each subject.

The evaluation in Group I was applied twice. At T1: at least 1 month after surgery and T2: 2 months later, after submitting a rehabilitation program. Evaluation in Group II was performed once.

Results: At T1 it was evidenced that the extension velocity of the operated knee was reduced by 19% respect to the healthy side, with an increase of the neuromuscular recruitment in Group I. The sEMG values of the healthy knee in Group 1 were remarkably higher in respect to the values of the healthy subjects in Group 2. At T2, after two months of rehabilitation program in Group I, KACLIR test showed that the values between both knees tended to equalise.

Conclusion: The combination of whole body vibration and sEMG recordings (KACLIR test) can detect the impairment as well as monitor the progress of the rehabilitation program for quadriceps muscle after ACL reconstruction. With the KACLIR App we are able to analyze and save the data from the KACLIR test and compare the results in a temporal manner. It is considered a well-tolerated applicable assessment and follow-up method for pathological and also physiological conditions.

Key words: KACLIR, sEMG, whole body vibration, quadriceps muscle, ACL

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MANAGEMENT OPTIONS OF CHRONIC LOW BACK PAIN: A RANDOMIZED BLINDED CLINICAL TRIAL

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Introduction: Chronic low back pain (CLBP) is the most common cause of long term disability in many world countries. It is common problem in primary care facilities and is notoriously refractory to conventional drug treatment. It seems there is no one treatment modality that is effective for all patients. Current multidisciplinary approach in the management of chronic low back pain, considers it as the consequence of combined effects of multiple arrays of interrelated physical, psychological, social and occupational factors.

The objective of the study is to compare efficacies of two active programs in management of CLBP.

Materials & Methods: This study was conducted in the department of Rehabilitation medicine, King Abdullah University hospital, Irbid, Jordan, between January and October 2009. A total of 100 patients were randomized to either 6 - weeks of multidisciplinary rehabilitation (group A) or therapist assisted exercise (group B). At baseline and 6 weeks, visual analogue scale (VAS) was estimated, as a primary outcome measure. Mc Gill and Oswestry disability scales, trunk forward flexion and extension, left and right lateral bending, were applied before and after treatment as secondary outcome measures.

Results: All outcome measures significantly improved in group A after treatment, compared to group B. VAS, Mc Gill, Oswestry disability scales, left and right lateral bending decreased significantly ($p = < 0.05$), whereas forward and backward bending increased ($p = < 0.05$). Significant number of patients returned to work ($p = < 0.05$) in group A at end of 6 weeks, compared to group B. These effects were maintained over 12 and 24 weeks follow-up.

Conclusion: Multidisciplinary rehabilitation improved functional indices and pain scales in group A compared to B. This might be an effective strategy in CLBP management.

Key words: chronic low back pain, multidisciplinary management, pain and disability scales

HIGH RESOLUTION ULTRASONOGRAPHY OF WRIST AND HAND

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Introduction: High resolution ultrasonography with high frequency probe-10-13 MHz, Doppler and Power ultrasonography has increased role to evaluate superficial structures of wrist and hand - tendons, joints, nerves and vessels.

The point of this work is to presence the normal anatomy finding of wrist and hand and describe wide spectrum of inflammatory, traumatic disease, entrapement neuropathies, and in this way delineate the nature and extent of the process.

Materials and methods: In this article we made examinations in 12 patients. All images were acquired by using ultrasound machine My lab 70 ESAOTE, with 10-13 MHz linear transducer. We used Doppler and Power ultrasound.

Results: Classic radiology can diagnosis bone and articular lesions while ultrasonography assesses different disorder of soft tissue. Some lesions cannot be detected by ultrasonography and require some invasive and expansive imaging modality (CT, MRI, MRI arthrography,...)

In first part of this article we described and illustrate normal anatomy of the wrist and hand –
- extensor tendons surface, six compartments and his attachment of radius and ulna - flexor surface of the wrist, n . medianus and ulnar nerve.

In second part we illustrate ultrasonography findings in tenosynovitis of wrist and hand, finger flexor pathology, carpal tunnel pathology, traumatic disorders.

Conclusions: Because of own characteristic – noninvasive, rapid, dynamic, low cost and repeatible technique high resolution ultrasonography is a first imaging technique in evaluation of wrist and hand disorder

Key words: hand , wrist, high resolution ultrasonography, flexor, extensor tendons

INFRARED THERMAL IMAGING IN EVALUATION OF INTERFERENTIAL CURRENTS IN THE TREATMENT OF COMPLEX REGIONAL PAIN SYNDROME

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Introduction Infrared thermal imaging is a non-invasive, non-contact and objective method, that provides information about vascular changes in complex regional pain syndrome, which allows monitoring of the course disease and efficacy of therapeutic procedures. The aim of this study is to evaluate, by using infrared thermal imaging, the effects interferential currents in the treatment patients with complex regional pain syndrome type I.

Materials and methods The study was conducted at the Clinic for Physical Medicine and Rehabilitation of the Clinical Center Nis (Serbia) from December 2004 to January 2007. The prospective randomized study included 25 patients with unilateral post-traumatic complex regional pain syndrome type I in the first stage, who had been diagnosed clinically on the basis of the modified research diagnostic criteria defined by the Budapest consensus group. Patients were treated with interferential currents and kinesitherapy. Bipolar interferential current therapy was applied, with 90 Hz frequency, for 15 minutes with electrodes positioned locally on the painful and swollen part. The patients from both groups received the first 10 therapies every day for 5 days a week (2 weeks), and the next 10 therapies were received every other day. The regions of interest were filmed by infrared thermovision camera Varioscan high resolution 3021 on both sides, before and after the 20 therapeutic procedures had been applied. Thereafter the quantitative analysis and the comparing of thermograms taken before and after the applied therapy were performed.

Results The quantitative analysis of the thermograms, before the applied therapy, was measured the mean maximum temperature difference between of the injured and the contralateral extremity ($\Delta T_{\max}$) $1.26 \pm 0.77^{\circ}\text{C}$, which after the applied therapy was reduced to $0.65 \pm 0.67^{\circ}\text{C}$. By comparing the thermograms, it was established that there was statistically significant decrease of the mean maximum temperature difference between the injured and the contralateral extremity after the therapy in comparison to the status before the therapy ($t = 8.827$; $p < 0.01$).

Conclusion By the use of the infrared thermal imaging we showed that interferential current therapy is effective in the treatment of complex regional pain syndrome type I in the first stage.

Key words: Complex regional pain syndrome, interferential currents, infrared thermal imaging

THE SIGNIFICANCE OF OXFORD HIP QUESTIONNAIRE IN ASSESSING ABILITIES TO PERFORM ACTIVITIES OF DAILY LIVING AFTER HIP ARTHROPLASTY

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Introduction: Hip arthroplasty is a routine surgical procedure which relieves pain and improves movement in patients with osteoarthritis. After surgery and rehabilitation treatment, patients experience improved performance in activities of daily living. The aim of this study was to analyze subjective well-being and abilities to perform certain activities of daily living prior to and after rehabilitation treatment.

Materials and Methods: A modified Oxford Hip Score Questionnaire was used in 145 patients with total hip replacement treated at the Medical Rehabilitation Clinic. Patients completed the questionnaire prior to rehabilitation treatment (4 – 5 weeks after surgery) and at discharge. The rehabilitation lasted 3 weeks on average.

Results: On admission, the mean Oxford Hip Score was 20,63 (satisfactory result), and 14,16 (good result) at discharge. After physical treatment, 44% of patients reported significant pain relief. In terms of activities of daily living on admission, patients found it difficult or impossible to get dressed or to put their shoes on (68.28% of patients), as well as to go shopping (55.17%), but after rehabilitation a significant improvement was achieved. Moderate difficulties were reported with household chores (56.55% of patients), and mild difficulties with maintaining personal hygiene (66.21%) and using public transport (64.83%).

Conclusion: Results of our study are in agreement with literature data. The reported pain is less intense, while activities of daily living are easier to perform.

Key words: hip arthroplasty; Oxford Hip Questionnaire; Activities of Daily Living

**THE WAY TO COMPLETE PSYCHOLOGICAL AND PHYSICAL RECOVERY AFTER
MULTIFRACTURAL INJURY OF CERVICAL PART OF VERTEBRAL COLUMN, OPERATIVE
TREATMENT AND REHABILITATION**

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Introduction: It is a fact that 5 - 10 % of people who have had a traffic accident or some fall, have serious injury of cervical spine. At that moment it's very important to prevent movement in that part. We do that through the immobilization. Then, when patient arrive at hospital the radiological evaluation, therapy for edema, immobilization and operative stabilization is necessary. Standard radiological treatment is made in 3 direction (profile, A-P, through the open mouth). In 30 % of cases it is C2 trauma, 50 % C7. MRI and CT are indicated when there is a possibility of spinal cord injury. That injury is worse because in most cases it causes permanent disability. For practical reasons there are 3 types of spinal injuries: Vertebral column injuries, spinal cord injuries, injuries of spinal ligaments. In most cases the combination of all three is present. FLEXION FRACTURE occurs when force acts in vertical direction, type and intensity of fracture depends of how force big is and in which position was the neck at the time of injury. There are 4 types of flexion fractures. LUXATION FRACTURE is when there is a totally luxation, separation of vertebral parts with ligament injury and spinal cord trauma. When vertebral fracture is combined with neurological trauma, the treatment shall be surgical. Surgical treatment should contain: placing bones in normal position, decompression of neurological parts and fracture stabilization.

Goal: We want to present the case report of patient who had serious injury of cervical spine with multivertebral fracture and spinal cord lesion and his several surgical treatments during medical rehabilitation.

Materials and methods: Lj. G, patient, 43 years old, hurted in a traffic accident in Bulgaria on 13. 01. 2013. In that country he was treated with traction, 5 days long and then he was transferred to the neurosurgical clinic. The precise diagnose is (Dg.): FRACTURA C2 /DENS/. FRACTURA CORPORIS VERTEBRAE C3 ET C4. FRACTURA C4, C5 LUXATIONEM. QUADRIPARESIS. The complex operation is done not long after that, OP (operation) 1: Preparatio vertebrae pars ventralis reg. C3 - C6. Extirpatio disci C4 - C5 et implantatio cage in i.v. spatii C4 - C5; OP2: Preparatio vertebrae pars dorsalis desarticulatio C4 - C5 bill.; OP3: Repositio luxationem C4 - C5 cum fixatio C3, C4, C5 et C6; and after 10 days OP4: Preparatio vertebrae pars dorsalis regio C2 - C7 et fixatio transarticularis C3, C4, C5 et C6. After successfully ended surgical treatment physical rehabilitation started.

Results: He was treated on Clinic for Physical medicine and rehabilitation in Nis, from 11. 2.- 18. 3. 2013. Final results were ability for walking and positioning in the bed, immobile neck. After that, medical treatment was continued in our medical institution. Special hospital of Ribarska Banja, for next three months. We will show you the improvement of functional status which we succeed through the: therapy with movement, hydrotherapy combined with movement and physical procedures.

Conclusions: Despite how spinal injury heavy and serious is, we proved that if we apply proper neurosurgical treatment, at proper time, consequences can be minimum.

Key words: Cervical fracture, quadriplegia

**REHABILITATION ASPECTS OF THE SURGICALLY AND CONSERVATIVELY TREATED
LOW BACK PAIN SYNDROME**

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Low back pain syndrome (LBPS), a disease of modern civilization, one of the most common entities from whom suffers every 10 persons in Serbia. LBPS is classified into primary and secondary, and as the duration of acute, subacute and chronic. The most common reasons for involvement of neurosurgeons in the treatment are: the existence of the intervertebral disc prolapse, lumbar spinal stenosis without signs of spinal instability, the existence of proven lumbar instability and tumor lumbar spinal canal. There is a perception that in the diagnosis and treatment of LBPS there are a large number of unnecessary medical procedures. In recent years, in the developed countries the plateau social and financial implications of LBPS is observed, which is explained using a guide based on well-documented evidence (EBM) with recommendations for diagnosis, treatment and rehabilitation. LBPS is a medical model of disease which diagnose is based on a good "triage" patients, which will allocate 2 % of patients with serious spinal pathology "red flag". Diagnosis of nonspecific mechanical LBPS raises a history and physical examination (finding antalgic scoliosis has a level of evidence C, Lazarevic's sign of the level of evidence B). Routine laboratory tests are not advised. Changes discovered methods of visualization are important only if they correspond to clinical findings. EMG is not necessary if radiculopathy is clearly clinically diagnosed. According to EBM NSAIDs are effective in the symptomatic treatment of patients with acute LBPS, COX -2 inhibitors may have short term benefits on gastrointestinal function. There is strong evidence of the effectiveness of Paracetamol. For the LBPS is not recommended for routine treatment with corticosteroids. Muscle relaxants are justified by strong muscle spasms. Antidepressants can be given as adjuvant therapy depressed patients. Early rehabilitation after the operation begins immediately dosed and intensive after 3-4 weeks in stationary conditions. According to EBM inaction is not recommended in patients with normal LBPS without neurological disorders. Spinal manipulation may be useful for facet joint subluxation. There are no reliable data on the effectiveness of lumbar support belts. It is recommended that the application of ice, and the use of tens, galvanic, interferential and diadinamic current in acute LBS for most agents, there is no solid evidence of efficiency. Most of the guide shows that exercise are not effective in the treatment of acute LBS in the first two weeks of the disease. In subacute rehabilitation LBPS application is encouraged thermal procedures, electromagnetic fields, lasers, including electrotherapy stimulation paretic muscles. Some exercise program leads to pain reduction and functional improvement. The rehabilitation of chronic LBS should vigorously apply hot packs, ice and hand massage. No proof that US has the influence of pain reduction, and studies the effectiveness of TENS show contradictory results. No evidence of favorable effects of acupuncture and lumbar corsets and belts. Intense and long-lasting therapeutic exercises and all forms of hydrotherapy have proven positive effects. The most important recommendations relate to the importance of primary and secondary prevention and elimination of risk factors that may prevent the occurrence and recurrence of LBPS.

**COMPARATIVE RESULTS OF DISCOGENIC RADICULOPATHY TREATMENT BY
PHYSICAL / OPERATIVE MANAGEMENT,
ILLUSTRATING THE DEGREE OF RECOVERY USING QUEBEC DISABILITY SCALE**

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Introduction/objective: The disc herniation, prolapse, protrusion, extrusion of nucleus of pulp often compress the corresponding peripheral nerve roots, thus creating a typical picture of radiculopathy. Treatment of these conditions may be conservative or surgically. The surgically treatment is the only choice in the case of absolute indications. In the case of the relative indications for surgical treatment, with the physical treatment could be achieved good recovery.

The aim of the work: To evaluate treatment results of Compressive Radiculopathy Discogena with relative indication for surgical treatment and check up the results of treatment of the same lesions achieved with physical treatment. Finally, we compare the achieved results and determine which of the two treatments leads to better recovery.

Study participants and methodology: The study included 100 patients who had a relative indication for surgical treatment. They were divided into two groups – those who were treated with physical treatment and those who were treated surgically. The degree of recovery after the treatment is verified by Quebec low back pain disability scale.

The research results were statistically analyzed and were compared according the statistical standards. The results are presented in tabular and graphic form with the legends and text explaining the individual obtained values and variables.

Conclusion: There are no highly significant differences in the degree of recovery of patients after both of treatments physical and surgically. We have the right to conclude according to our research demonstrated that the physical treatment should be first choice in treating such patients.

Key words: compressive radiculopathy, surgical treatment, physical therapy, Quebec scale

**COMPARISON OF LASER THERAPY WITH PULSED ELECTROMAGNETIC FIELD
THERAPY FOR PAIN RELIEF IN PATIENTS WITH CHRONIC LOW BACK PAIN**

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Low back pain (LBP) is one of the most common medical and social problems. Although pharmacologic analgesic therapies may be effective for patients with acute LBP, they are unsatisfactory for many patients. The use of pharmacologic therapy can interfere with physical activity and produce side effects (1). These concerns have increased interest nonpharmacologic therapies for LBP.

Aim: The study was carried out to evaluate and compare the effect of low frequency pulsed electromagnetic field (PEMF)(2,3) and low power laser therapy (LLLT)(4)

Methods: The 31 patients LBP based on clinical findings were included and randomly assigned to treatment with laser or PEMF. 16 patients was treated with PEMF - frequency 25 Hz, power 6mT 15 min every day 3 weeks (except weekend) /15 treatment in all. 15 patients received the laser treatment - IC laser wavelength 780nm const., power output 10mW, 1-2J/cm² per points, 6 points of skin overlying L4,L5 and S1 radix bilateral 3 weeks (except weekend) /15 treatment in all.

Results: Evaluate the effects of laser and PEMF sessions on pain relief, in the post - therapy period compared to pre - therapy period in both groups was observed statistically significant improvement in respect to all parameters: VAS 0 - 100 peak pain, patients degree of impairment-zero to four points were awarded for the following responses:no impairment 0, mild 1, moderate 2, limited 3 and severity limited 4 and improvement by physical examination - Schober test - Lumbar Range of Motion). Pain level and degree of physical improvement were scored and analyzed by related t-test and unrelated t-test. Differences were considered statistically significant at $p < 0,05$.

Conclusion: No systematic or local side effects were reported during or after the treatment period. This study revealed that application of LLLT and PEMF is equally effective and safe method in pain relief and function in patients with LBP.

THE EFFECT OF MOBILIZATION TECHNIQUE FOR STRETCHING IN PATIENTS WITH CHRONIC CERVICAL SYNDROME

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Introduction: Chronic cervical syndrome is associated with pain, disability and quality of life of patients. The goal of this research is the objective evaluation of the therapeutic effect of mobilization techniques for stretching (MTS), in comparison with medicamentous therapy and classic physical procedures, in treating of patients with chronic cervical syndrome.

Materials and methods: This study was made as experimental, randomized, controlled clinical trial, opened type. The examination included 60 patients (45 females and 15 males), with chronic cervical syndrome. All patients were divided in three groups. The first, control group of 20 persons, composed of patients treated with medicamentous therapy (Meloksikam of 15 mg, 1 tablet per day). The second group consisted of 20 patients treated with MTS and the third group consisted of 20 patients treated by classic physical procedures (manual massage and therapeutic exercises). All procedures were implemented during 10 days. As observing parameter was used: Lattinen test for the evaluation of the pain sensitivity and the range of motion in cervical spine, before and after therapy. For the statistical analysis of the acquired data, was used Student's t-test.

Results: After therapy the pain was considerably reduced or disappeared in each group, cervical mobility was increased, but these effects were the most significant in the II group of the examinees, treated by MTS ($p < 0,001$), than the effects in other groups of patients: I group ($p < 0,05$) and the III group ($p < 0,01$).

Conclusions: According to the results of this study it can be concluded that using mobilization techniques for stretching is very effective therapeutic procedure in treatment of patients with chronic cervical syndrome.

Key words: cervical syndrome, mobilization techniques, stretching

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SPECIALIST REHABILITATION SERVICE

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Introduction: A ground breaking and innovative complex rehabilitation pathway has been developed in Cheshire and Merseyside, UK to cover a population size of 2.4 million with an additional investment of £10 million. The design of this pathway is the result of partnership working between commissioners, Hospital Trusts, Social Care to ensure improved clinical outcomes for patients with highly complex rehabilitation needs following a sudden and traumatic illness or injury.

Methods: NHS Cheshire and Merseyside, England set out a vision for a rehabilitation consultant led pathway for complex rehabilitation that is regionally planned and locally responsive. Over the last twelve months, rehabilitation services have undergone a major restructure across Cheshire and Merseyside. As a result, the Rehabilitation Network includes a co-ordinated pathway for Hyper Acute, Acute and Sub-Acute bed based units, extended rehabilitation and specialist community and outpatient services to realize the benefit of quality improvements. Key drivers and principles for change were identified, including eliminating fragmented care and gaps in service provision, high-quality services and a requirement for timely and appropriate access to rehabilitation professionals.

Results: The issues identified in relation to the delivery of services for complex rehabilitation formed the basis of service and quality improvement. Strong, credible clinical leadership from all health and social care professionals has enabled implementation of the re-designed pathway. A Rehabilitation Network single point of access screens all referrals and works in partnership with the Rehabilitation Consultants to ensure timely and appropriate placement according to rehabilitation need. Rehabilitation Co-ordinator based within each Unit fulfils a unique role by providing the voice of the patient and family, engaging with the Rehabilitation Consultant and multi-disciplinary team, and ensuring that best practice clinical models of care based on the BSRM guidance (2010) are adopted. Initial findings after six-months of implementation is showing improved clinical outcomes, reduced lengths of stay within the pathway, improved patient and family support and better partnership working. Further details will be provided within the poster.

Conclusion: The process of strategy development of the rehabilitation pathway across Cheshire and Merseyside has provided an opportunity for a comprehensive rehabilitation service model review. Initial developments within the Rehabilitation Network are seen as the start of an evolutionary process of service model change that will be reviewed and monitored.

Key words: Clinical leadership, rehabilitation co-ordinator, partnership working, rehabilitation pathway

**TRAINING NURSES ON BED POSITIONING AND TRANSFERS OF PATIENTS IN A
REHABILITATION CENTER**

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Introduction: Rehabilitation services need to improve in quality to maintain patients in optimum condition. Euromedica Arogi Thessaloniki is a newly founded (10/2010) rehabilitation center with 220 beds capacity. It offers services to orthopaedic, CVA, TBI, SCI, and MS patients and there is a great variety of severity and clinical presentation of patients. One of the highest priorities is the continuous training program of our healthcare professionals. For that reason our Center organized training programs for the nurses on bed positioning and transfers of patients.

Material and Methods. The center has 90 nurses with 10 paramedics, 48 PT, 5 OT, 5 SLT, and 14 hydrotherapists. The training program was created for nurses and paramedics. The training sessions were planned according to the following plan:

1. Specified Subjects

A. 1st Cycle: Patient Transfers

B. 2nd Cycle: Positioning patients in bed, position-changes per patient category

2. 90 nurses and 10 paramedics were divided into groups of 5 people (20 teams in total)

3. Two training groups were scheduled per day and every training session lasted for 3 hours (6 hours per day in total)

4. The training sessions for both thematic cycles is equivalent to 20 working days, commencing on 19/03/2013 until 16/04/2013, equivalent to a total of 120 hours.

5. The trainers were the heads of the physiotherapy.

The training program was planned as follows:

- During the first half hour, the trainer made reference to the theoretical part of the thematic cycle
- Thereafter, each trainee performed the procedure on certain patients per category, from the department to which he belongs

Results: Our staff completed the training in the anticipated timetable. The prevalence of musculoskeletal disorders in nurses and paramedics were reduced by 24,7% in all the wards.

Conclusions: Quality of rehabilitation services is connected with continuous training. The ultimate goal of the training program is skilled nursing care and reduced rate of occupational hazards to promote efficiency in patient care.

Key words: Bed positioning, transfers, education, occupational hazards

ON SOME FORGOTTEN HEROES OF REHABILITATION MEDICINE

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“Simple ideas lie within the reach only of complex minds.” Remy de Gourmont, 1858 - 1915, was a French Symbolist poet, novelist, and influential critic: was stricken with lupus vulgaris. Disfigured by this illness, he largely retired from public view; he began to suffer from loco-motor ataxia and be increasingly unable to walk.

Reviewing introductory chapters and articles on the history of Rehabilitation medicine, reveal the fact that many physicians, allied health professionals, artists or authors, who contributed to the academic and public awareness of the disabled people, are not included in the “formal” history of our profession. The writer Robert Graves (1895-1985) invented the term *Apoplepsia* (turning the head away): himself victim of Shell Shock in the First World War trenches was aware of the public general ignorance of people with disabilities. His most famous book “I, Claudius”, dealt with a severely disable emperor...

To mention few examples: Vincenz Priessnitz (1799–1851) who founded the first hydrotherapy institute in the world in Gräfenberg in 1822 - Priessnitz had a God - given gift as a physician, he had intuition, extraordinary observation skills and memory, and, moreover, he introduced his ideas at the right time and in the right place. Johann Schroth 1798 –1856, Johann Friedrich von Hessel; Friedrich Mommsen (1885-1976), Konrad Biesalski (1868-1930), Wilhelm Würtz (1875-1958) and the Berlin’s Oskar-und-Helene-Heim, pioneers of orthopedic and rehabilitation institution for the disabled children and many other forgotten heroes.

CAN MAGNETIC RESONANCE IMAGING FINDINGS PREDICT TREATMENT OUTCOME IN ADHESIVE CAPSULITIS: A PROSPECTIVE STUDY?

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Introduction: Adhesive capsulitis is characterised by spontaneous onset shoulder pain and subsequent restriction of active and passive glenohumeral joint motions. The onset is mostly insidious and of idiopathic in origin. Temporal course of the disease may be very long and may affect quality of life and work ability. Although adhesive capsulitis is a clinical diagnosis, magnetic resonance imaging (MRI) can be used in order to identify etiological factors, differential diagnosis and treatment planning. The aims of treatment in adhesive capsulitis are, reducing or allevating pain and improving joint functions. The purpose of this study was to investigate the predictive value of MRI findings in treatment outcome of adhesive capsulitis patients.

Materials and methods: A total of 30 patients with a clinical diagnose of adhesive capsulitis were included in the study. All the patients were evaluated with MRI prior to 15 day physical therapy programme which consisted of physical therapy modalities, range of motion exercises and stretching exercises. Soft tissue signal changes at the rotator interval level, thickening and increased intensity in the inferior glenohumeral ligament as a reflection of the axillary recess were considered as positive findings supporting adhesive capsulitis on MRI. All the patients' range of motion (ROM), visual analogue scale (VAS), health assessment questionnaire (HAQ), and quick-disabilities of the arm, shoulder and hand (Q-DASH) scores were recorded before and at the end of the treatment programme.

Results: Out of 30 patients, 9 patients had MRI findings consistent with adhesive capsulitis while 21 patients had no MRI findings. There was significant improvement in all patients in terms of ROM, VAS, HAQ and Q-DASH scores after treatment. However there was no significant difference between patients with and without MRI findings in both pre-treatment and post-treatment evaluations.

Conclusion: This study revealed that existence of specific MRI findings in adhesive capsulitis do not affect treatment outcome and have no prognostic importance. However MRI is important in exclusion of other shoulder pathologies in the differential diagnosis of adhesive capsulitis.

Keywords: Adhesive capsulitis, magnetic resonance imaging, physical therapy

ENABLING THE DISABLED THROUGH TECHNOLOGY

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Introduction: North West Assistive Technology (NWAT) serves a population of 6.6 million people across Cheshire, Merseyside, Greater Manchester, Lancashire and South Cumbria in the United Kingdom. The service was established in 1995 to provide specialist assistive technological aids to support patients with severe disability across all age groups. NWAT has a large multi-disciplinary team that consists of: Consultant in Rehabilitation, Service Lead, Speech and Language Therapist, Occupational Therapist, Business Manager, Deputy Rehabilitation Engineering Manager, team of Rehabilitation Engineers and Environmental Control Co-ordinators.

The aim and the vision of the service are to promote independence, through the provision of assistive technology to meet the needs of all clients in an inclusive and holistic manner. This will facilitate control of their environment both at home and in a Hospital setting.

Materials and methods: NWAT reviewed data base activity over the twelve month period 2012-2013, particularly analysing the number of patients who benefitted from the service, the cause of their disability, the most common diagnosis of new referrals, the various types of technologies we provided and the associated benefit for the patient group.

Results: In the twelve month period NWAT received approximately 400 new referrals for both assistive technology and communication devices, and has a current patient group of 1200, who have various diseases and disabilities. Analysis showed that the most common conditions were: Multiple Sclerosis, Spinal and Brain injuries and Amyotrophic Lateral Sclerosis. NWAT provided a range of assistive technology which included environmental control systems, specialist computer access and specialist communication devices.

Patient and family feedback highlighted that the service is very successful in: Promoting patient independence and autonomy, managing and reducing potential risk, facilitating socialisation and inclusion, reducing stress and frustration levels on both patients and cares and greatly improving quality of life.

Conclusions:

- The service helps to improve quality of life and independence to disabled people across all age groups
- NWAT believes that the service will continue to ease the pressures on statutory health and social services providers by enabling individuals to remain in their own homes with increased independence, which is especially relevant in today's economic climate

Key words: Assistive Technology, environmental control, computer access, communication aids, disability

ADVANTAGES OF COMBINED PHYSIOTHERAPY AND BALNEOTHERAPY TREATMENT OF PATIENTS WITH ANKYLOSING SPONDYLITIS

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Introduction: Ankylosing Spondylitis (AS) is a chronic inflammatory disease, characterized by limitation of the spinal and thoracic mobility, structural damage, pain and stiffness, ankylosis, leading to impaired daily activities and reduced respiratory capacity.

Objective: To compare the results of treatment with combined physiotherapy and balneotherapy and treatment with physiotherapy alone, in patients with AS.

Materials and Methods: Participants were patients diagnosed with AS, referred to "Mlječanica" during the two years period (Apr 2011 till Apr 2013.). The patients were randomly divided into two groups: A (n=22) treated with standard physiotherapy in combination with balneotherapy, and B (n=17) treated with standard physiotherapy alone.

Inclusion criteria were: diagnosis of AS, based on the Modified New York Criteria (van den Linden et al. 1984) and duration of the disease less than 20 years.

Exclusion criteria: Morbus Reiter, psoriasis (groups A and B) and known contraindications for use of balneotherapy (group A).

The outcome was evaluated by Bath Ankylosing Spondylitis Functional Index (BASFI), VAS for assessment of pain and stiffness (the score range from 0 to 10), Modified Schober test for spinal mobility, measurement of chest expansion and occiput - to wall distance (WHO / ILAR recommendations, van der Heijde et al, 1999). All assessments were done at admission and at discharge, by two PT. Results were presented as median with minimum-maximum values. Statistical analysis was carried out using the Statistical Package SPSS, Inc.2006. A value of <0.05 was considered significant.

Results: Both groups were homogenous regarding the gender, age and duration of disease (all male, median age 38.5; range 20-63). The median disease duration was 9 (2-19) years. At discharge the functional results were slightly better in group B, without statistical significance ($p=NS$). The spinal mobility measurements showed significant increase in group B ($p<0.05$). Pain and stiffness decreased significantly in both groups, but in group A at higher significance ($p<0.01$).

Conclusion: Combination of standard physiotherapy and balneotherapy leads to significantly better results in improvement of spinal mobility and pain of patients with Ankylosing Spondylitis.

Key words: ankylosing spondylitis, physiotherapy, balneotherapy

CO-RELATION AND INTERACTIVITY BETWEEN DAILY LIVING BEHAVIOR AND OSTEOARTHRITIS KNEE PAIN LEVEL AT ELDERLY PATIENTS

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Introduction & aim: Osteoarthritis is the most common disease of joints in adults around the world. Clinically significant osteoarthritis of the knee is found at approx. 10 % of the adult population. The frequency of knee osteoarthritis continues to accelerate with whole endogenous and exogenous risk factors for osteoarthritis, like age, but especially because of the increasing of obesity in population in the age over 60 years. Grotle et al. found a significant dose-effect relationship for overweight (BMI >30) as a risk factor for knee osteoarthritis. In the men population aged 60 to 64 osteoarthritis is more commonly found in the right knee (23%) than in the left knee (16.3%), while its distribution seems to be more evenly balanced in women (right knee, 24.2%; left knee, 24.7%). Patients suffering from osteoarthritis often complain of pain on movement, typically occurring when movement is initiated or when the patient begins to walk. The pain is often described as a dull ache. As osteoarthritis progresses, the pain becomes continuous, and the functionality of the joint is severely impaired.

Materials and methods: We have attended patients with clinically significant osteoarthritis of the knee. These patients have been treated in clinic for physical medicine and rehabilitation during 2012 to 2013. All of them have been under strictly controlled obesity treatments for some period during past 5 years. Parameters which have been controlled are as follows: age and sex, pain (visual pain scale – VAS), range of movement / walking, activities of daily living measure (Lequesne index), BMI index and weight changes (losing). Measuring check-points: before therapy and physiotherapy for knee osteoarthritis and after 3 month. Results are evaluated and interpreted statistically.

Results: Initial data: patients observed: 40 patients; ages: between 63 and 74 years; sex: 22 women and 18 men; two groups: group I (BMI 25-30), group II (BMI over 30); lost weight goals (fulfilled): - 5 kg; treatments applied: exercise therapy, stretching/walking, magnetic therapy and electroanalgesic pain management.

Three month later (after the beginning of treatments): range of movement improved for average 18%; Lequesne index improved in group I (BMI 25-30) average 19%; Lequesne index improved in group II (BMI over 30) average 14%.

Conclusions: In this study we have followed 40 patients with knee osteoarthritis, with BMI from 25 - 30 in first and BMI more than 30 in second group. After this study we can conclude: elderly persons' losing 5 kg weight and making regular exercise plus physical therapy knee OA would decrease (by Lequesne index) in average 16% in the group with initial BMI 26-30 and 12% in the group with initial BMI 30 and more. Lowering BMI leads towards less suffering of osteoarthritis (by Lequesne index). This mean that interactivity between

Key words: knee osteoarthritis, obesity, physical therapy

UNIPOLAR AND BIPOLAR PROSTHESIS IN PATIENTS WITH FEMORAL NECK FRACTURES – IS THERE ANY DIFFERENCES?

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Introduction: The treatment of choice for the femoral neck fractures in elderly people is hemiarthroplasty. There are two common types of partial prosthesis: unipolar and bipolar. The aim: To estimate if there is any difference between two types of prosthesis in functional outcome.

Methods: We followed 50 patients with monopolar (Austin Moor type) and 50 patients who underwent bipolar (Duo-Kopf) hemiarthroplasty. We used FSQ (Functional Status Questionnaire), VAS and Harris Hip Score to evaluate functional outcome one and five years after surgical procedures. The data were analysed by SPSS packet, using methods of descriptive and analytical statistics.

Results: The results show that there is no significant difference in functional outcome one year after surgical procedures ($p=0,210$), but there is significant difference after 5 years, the patients with monopolar prosthesis showed significant lower grade of functional outcome ($p=0,004$). The control x-rays show significant degenerative changes in the patients with monopolar prosthesis.

Conclusion: Our results show that short term outcome is satisfied for both groups. Regarding age of the patients, it is very important to allow patients early mobilisation, regardless of type of prosthesis. Longterm results showed better outcome in patients with bipolar prosthesis. As the matter of fact, monopolar prosthesis are used nowadays very rarely, but regarding low income of some countries, monopolar prosthesis could be used frequently.

Key words: hip fracture, functional outcome

**REHABILITATION OF PATIENT WITH PERCUTANEOUS VERTEBROPLASTY AFTER
OSTEOPOROSIS FRACTURE OF SPINE - CASE REPORT**

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Introduction: One of the many common complications of osteoporosis, represents compression fractured vertebrae of the thoracic and lumbar spine. The treatment is complex. Besides proper nutrition, medications, application of appropriate orthopedic devices - orthoses, surgery with percutaneous method of vertebroplasty, a patients choice of treatment is physical procedures and kinesiotherapy.

Purpose: To display the physical therapy and rehabilitation for patients with percutaneous vertebroplasty in thoracic and lumbar part of the spine.

Materials and Methods: The patient is a woman aged 56 years, diagnosed with compressive fractures on seven, eight and nine thoracic vertebra and second lumbar vertebra as a result of postmenopausal osteoporosis. One month after percutaneous vertebroplasty, the patient complains of pain yet along the thoracic part of the spine that is distributed, including the ribs and pain in all joints, weakness in the arms and legs. The patient was treated with physical procedures, transcutaneous electrical nerve stimulation, interferin currents, ultrasound sonography and kinesiotherapy in the Department of Physical Medicine and Rehabilitation in Skopje, Macedonia. The duration of the procedure was one month. Parameters for monitoring were extent of mobility of the spine and extremities and Visual analog scale (VAS) for pain.

Results: After the rehabilitation treatment, the reduced pain by VAS is 50%, ROM of the cervical part of the spine is increased to 20% flexion, to 15% extension, 10% the right and left lateroflexion and 15% of rotation. ROM of the lumbar spine is increased to 20% of flexion, 5% of extension, 10% of lateroflexion, and rotation of 5%.

Conclusion: Physical medicine and rehabilitation plays an important role after making the percutaneous vertebroplasty on the spine with osteoporotic fractures. The contribution is significant on the improvement and maintenance of function paravertebral musculature and musculature of the locomotor system, thus reducing pain. Time and teamwork with patients with vertebroplasty provides quality recovery.

Keywords: osteoporosis, compressive fractures, vertebroplasty, rehabilitation

NORTON SCALE USED FOR PREDICTING REHABILITATION OUTCOME IN THE ELDERLY: A SYSTEMATIC REVIEW

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Introduction: Norton scale is usually used for assessing pressure ulcer risk. Recent studies show that except for assessing pressure ulcer risk, Norton scale may be used for predicting rehabilitation outcome in the elderly. To the best of our knowledge, these studies have never been systematically reviewed until now.

Materials and Methods: A literature search was conducted for all studies concerning Norton scale being used for predicting rehabilitation outcome in the elderly. The current knowledge concerning this unique association is presented here.

Results: Norton scale scores are negatively associated with complications other than pressure ulcers during rehabilitation, prolonged rehabilitation, poor rehabilitation immediate outcome, falls more than a year following rehabilitation, and mortality more than a year following rehabilitation in elderly patients with hip arthroplasty, stroke, and hospital - associated deconditioning.

Conclusions: Norton scale may be used for predicting short - term and long - term rehabilitation outcome in the elderly. We believe that Norton scale may be an ideal tool for predicting rehabilitation outcome in the elderly since it is easy – to - learn, easy – to - use, and not time consuming. But most importantly, it is already being used successfully, so implementation should be simple.

Key words: elderly, Norton scale, rehabilitation

MENTAL IMAGERY FOR THE MANAGEMENT OF PHANTOM LIMB IN LOWER LIMB AMPUTEES: OUR EXPERIENCE

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Introduction: The better understanding of the brain's role in phantom limb has opened the way to new treatments and some promising new therapies are on the horizon, like the Mental Imagery. Phantom limb (PL) is a complex phenomenon that includes a wide variety of symptoms: pain, paresthesias, abnormal movements or uncomfortable positions, referred to the absent limb. It obviously interferes with the patient's quality of life. After the loss of afferent signals the primary somatosensory cortex undergoes substantial reorganization: the areas that are near to the one that controlled the amputated limb will take over this cortical region that no longer receives input. This maladaptive plasticity partly explains some instances in which afferent nociceptive stimulation of neurons within the stump or surrounding areas can produce sensations in the missing limb (Bolognini, 2013). Mental Imagery is a simple technique in which the neuromatrix became tricked by the patient's imagined movements of the PL and the cortical reorganization decreases (MacIver, 2008).

The aim of our study is to test the efficacy of Mental Imagery in reducing the phenomenon of the PL in lower monolateral amputees.

Materials and methods: Amputees affected by lower limb amputation and PL, were enrolled in the study and randomly divided in two groups. All subjects received the same daily standard pre-prosthetic and prosthetic program. The experimental group participated in the Mental Imagery training program 2 times a week for 4 weeks, while the control group had the same number of extra sessions of standard exercises. This new technique aims at treating the PL as a real part of the body. Following the physiotherapist's advices the patient had to realize mental movements of the PL.

Each session was individual and consisted in 15 "phantom's movements", as described by Ulger in 1998, after relaxation exercises. A comfortable and quiet therapeutic setting was reserved.

Specific assessment's scales were used to evaluate phantom pain and painful phantom sensation: the second group of questions of the Prosthetic Evaluation Questionnaire related to PL and the Brief Pain Inventory.

Results: The evaluated phantom phenomena have shown a trend to decrease more in the experimental group than in the control group. No full statistical analysis was done because of the few amputees enrolled (n 25). In particular the intensity and the frequency of PL sensation decreased by 25% and 12% respectively; the intensity and the duration of the PL pain were reduced by 23% and 13% respectively.

Conclusions: Mental Imagery could represent a helpful tool to decrease the PL pain and/or sensation by creating a normal return signal to the neuromatrix. It is a simple, safe and inexpensive therapeutic exercise that can be done by the patient himself, after a proper instruction of the technique. No device is needed for the practice and it has no contraindications.

Key words: Phantom limb, amputee, mental imagery, pain, sensation, neuromatrix

PHYSIATRIST EXPERIENCE IN THE REHABILITATION OF INPATIENT PSYCHIATRIC PATIENTS

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Introduction: From January 2013. at the departments of Psychiatry Clinic, as a part of a team in the treatment of psychiatric patients, physiatrist and physiotherapist were included. Earlier consultant working principle was offered only to the patients with movement difficulties, where rehabilitation is conducted in order to prevent immobility syndrome. The new approach requires a continuous presence of physiatrist in medical rounds, with team planning rehabilitation for all patients that are considered necessary. We found that a significant number of patients, that needed rehabilitation treatment without a delay, were with associated orthopedic, surgical and neurological comorbidities. During those 6 months, we have had 46 patients: five orthopedic, where we performed physical training program and applied electromagnetic field, laser, TENS; two oncology patients after partial mastectomy which we rehabilitated in order to prevent contracture of shoulder joint and occurrence of lymph edema and two patients with multiple sclerosis that had depressive disorder. In our program, patients with cervical and low back pain were included (those syndromes are common in patients who are alcoholics). New experience was group of 12 patients with rigor, posture disorder, bradykinesia, impaired walking, with expressed extrapyramidal syndrome, as a side effect of a certain group of neuroleptics. Our program consists of breathing exercises, stretching, balance and coordination exercises to correct posture and walk. Before this, our work at the Psychiatry Clinic has been at the consultation service level and at the same period last year, only 5 patients have been included in rehabilitation program. Something that is new in our work as well as in the World is dance therapy and our therapist is trained in such way. In this therapy were included 2 patients with expressed parkinsonism. Our future goals and plans are to prove the effectiveness of rehabilitation measures at extrapyramidal and metabolic syndrome, resulting from application of certain group of neuroleptics and to include as much psychiatric patients in rehabilitation. They are going to be monitored through tests (time up and go test, spatial orientation test) and studies.

Conclusion: physiatrist and physiotherapist included in a team dealing with the treatment of psychiatric inpatients, have an important role in their rehabilitation, complex perception of their situation and their preparation for the continuation of life in everyday surrounding.

TIMING AND FREQUENCY OF PARKINSON'S DISEASE (PD) SCREENING IN DETECTION OF A PREDICTABLE COURSE IN PREMOTOR PD

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There is an emerging consensus on the features that makes up premotor PD (Parkinson's disease) and greater evidence on the performance of several diagnostic tools for PD.

Parkinson's disease at risk syndrome (PARS), describes premotor PD, and its development into 4 stages, leading up to the manifest PD. The stages, for patients who do not yet have clinical PD, are defined as: prephysiologic, preclinic, premotor and prediagnostic.

PD patients have lower cerebrospinal fluid (CSF) α -synuclein levels, loss of DJ-1 function as a cause of autosomal recessive parkinsonism and low levels of DJ-1 in the CSF of patients with typical "sporadic" PD. LRRK2 mutations cause autosomal dominant parkinsonism. Parkin and PINK1 can help into how protein alterations cause neurodegeneration and how to quantitatively assess these changes as potential biomarker of PD. But screening, in select populations, might become appropriate if better understanding of the penetrance and predictability of a positive test is achieved.

PET and SPECT ligands may detect early abnormalities in presynaptic nigrostriatal terminal function. The rate of dopamine transporter (DAT) binding loss and Fluorodopa F18 reduction is 4 - 13% annually in early PD, correlates with the severity and the symmetry of motor scores in early PD.

The latency period from disease is not known, and it is likely quite variable. Clinicopathologic studies suggest that the pathologic process in the CNS begins 4 -7 years prior to onset of classic motor symptoms.

Neuroimaging changes may also occur in the early phase of PD. Hyperechogenicity of the substantia nigra (SN) occurs in a high percentage of PD patients and may be a risk marker of PD. Recent MRI techniques may detect the earliest changes of PD and reported increased diffusivity in the area of the olfactory bulb and olfactory tract using diffusion tensor imaging. Their validity is established only to patients with phase 3 disease.

The assessment of sympathetic innervation of the heart using MIBG SPECT scanning is another currently available approach. In early PD reduced cardiac uptake of MIBG is reported.

In subjects with lower smell identification scores and bowel movements frequency earlier in life there is a higher incidence of PD and asymptomatic α -synuclein pathology. PD has been noted to emerge a mean of 12.7 years after the diagnosis of REM sleep behavior disorders (RBD). The identification of numerous gene mutations related to PD is indicative of a disease process that begins long before neurologic symptoms emerge.

The 2 strongest risk factors for PD are a family member with genetic mutation and a diagnosis of idiopathic rapid eye movement behavior disorder (RBD). The risk of PD in a LRRK2 is approximately 20 times higher than in a noncarrier. Lifestyle risk factors as not smoking and drinking fewer caffeinated beverages may produce significant modification of the risk of PD. Less midlife adiposity and fewer bowel movements, greater calcium consumption and exposure to pesticides may also increase the risk of PD.

Two - stage screening, where the first test is relatively inexpensive but sensitive and moderately specific, reduces the number of expensive confirmatory tests. Using imaging as the second test reduces costs by lowering the number of scans needed. The first-stage test must be at least as

sensitive as imaging, to have a high overall accuracy rate.

Olfactory testing is moderately sensitive for PD. Findings suggest that they are not sufficient by itself to screen for PD, but they may be combined with a more sensitive test to detect premotor PD.

Neuropathological staging system by Braak and coll., allows predictable evolution of pathology. Understanding the order of onset of clinical and observable physiological features could guide screening strategies for premotor PD.

For implementation PD screening, it is important to understand the time line of emergence of nonmotor clinical features of PD and the timing of the onset of dopaminergic abnormalities in the striatum. The frequency of screening for at-risk individuals depends on the time course of the evolution of synuclein pathology. Many nonmotor features are relatively nonspecific, particularly in the elderly.

In the future first ongoing research goal will be to provide the tools that can determine when nonmotor symptoms are PD-related or not. Second long-term goal of the research will be to design clinical trials to test treatments that might prevent or delay the onset of motor features of clinical PD.

TREE FALLING AND SPINAL CORD INJURY: CASE SERIE

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Introduction: Falling is a common cause of spinal cord injury (SCI) and can cause permanent disability. This paper aims to characterize the population admitted to a Center of Rehabilitation Medicine, with SCI, after falling from a tree, in the last three years. The papers on this topic are scarce, so it may be a contribution to a better scientific knowledge in this area.

Materials and methods: Sample includes patients with SCI caused by falling of a tree and discharged from a Center of Rehabilitation Medicine, between 2010 and 2012. We collected demographic data, type of tree, level of injury, AIS classification, Functional Independence Measure (FIM), Spinal Cord Independence Measure (SCIM) and destination after discharge. Values of "FIM gain" and "SCIM gain" were calculated. Data were analyzed using SPSS ® for Windows ®.

Results: We considered a sample of 16 patients, of whom 75% were male. The mean age was 58.19 years (min: 24, max: 81). Regarding education and occupation, 93.8% had only primary education and 1 patient (6.3%) had studied up to 9th grade. The most common occupation was manual/rural labor (75%) and of these, only 2 patients were loggers. The remaining 25% were retired. The average hospital stay was 131.06 days (min: 24, max: 305). Regarding the level of injury, 18.8% were high quadriplegic, 18.8% were low quadriplegic, 43.8% were dorsal paraplegics and 18.8% were lumbar paraplegics; 37.5% had complete injury and 62.5% had incomplete injury. The tree from which there were more falls was the olive tree (37.5%); 12.5% fell of a pine; 12.5% of a peach tree; 6.3% of a walnut; 6.3% of a cherry tree; in 25% of cases the type of tree was unknown. The month of the year in which there were more falls was November (37.5%). February accounted for 18.8%. Other months accounted for approximately 6%. These differences are significant, with a higher prevalence of falls from olive tree, in November, probably related to the olive harvest. There is a significant difference between age and the fact that the injury is complete or incomplete (the elderly have incomplete lesions, $p = 0.031$) and there is no significant correlation between age and level of injury. No other correlation was found. This may be due to the small sample. Note that 87.5% of patients returned home after discharge.

Conclusion: The average age of the sample is close to 60 years. The elderly represent a group of risk. Factors such as a narrow channel, a column with low flexibility and reduced dexterity and neuromotor coordination contributes to the risk of SCI. To emphasize the danger of olive picking, often made without security measures, and represents 37.5% of falls. Falling of a tree is a preventable cause of SCI and its incidence can be reduced. Awareness campaigns are needed, especially in rural areas, to inform the public and promote the adoption of security measures when carrying out activities involving climbing trees.

Keywords: Spinal cord injury, fall, tree

TRAINING NURSES AND THERAPEUTIC STAFF IN THE USE OF FIM IN REHABILITATION PATIENTS

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Introduction: Rehabilitation services need to improve in quality to maintain patients in optimum condition. Euromedica Arogi Thessaloniki is a newly founded (10/2010) rehabilitation center with 220 beds capacity. It offers services to orthopedic, CVA, TBI, SCI, and MS patients and there is a great variety in severity and clinical presentation of patients. It is important for the staff of a rehabilitation center to focus on the functional goals of the patients and encourage them to fulfill them. For that reason our Center organized training programs for nurses and therapeutic personnel for the proper use of FIM.

Material and Methods. The training sessions were planned according to the following plan:

The training sessions took place in 5 patient wards and the Intensive Care Unit of Euromedica - Arogi Rehabilitation center. Ninety nurses 48 physiotherapists, 14 hydrotherapists,, 5 speech and language therapists and 10 paramedics were divided into teams of 6 people (28 teams in total) The daily training session involved one team and lasted for 4 hours (the first hour involved an introduction to the theoretical part and the last 3 hours involved practical training). Each training session equals in 20 working days, commencing on 03/06/2013 until 30/06/2013 (120 hours total).The training is divided into two phases.

FIRST PHASE: The physiatrists and occupational therapists had the role of the trainer and the trainees were the heads of the physiotherapy and nursing department. During the first hour the trainer made a theoretical introduction of the specified subject. In the 2nd week each trainee administered the scale and scored in 10 patients. By the end of this phase a control of the results was performed.

SECOND PHASE: During the 3rd week the heads of the physiotherapy and nursing department had the role of the trainer. Each trainer (head of physiotherapy or sister) was responsible for training the subordinates of their department. Again during the first hour the trainer referred to the theoretical part of the specified subject. In the 4th week each trainee administered the scale in 10 different patients. At the end result check was performed.

Results: Every member of the staff is more aware of the functional abilities and limitations of each patient and taking that into account they help the patient progress in their rehabilitation program. The notes of the team meeting are now better orientated towards the goals of the patients.

Conclusion: Rehabilitation is a multidisciplinary process and the final outcome is based on combined group effort of all team members. Recognizing the patient's abilities plays a crucial part in achieving the goals set for the patient.

Key words: education, rehabilitation process, FIM scale

EARLY REHABILITATION IN THE STROKE UNIT – PRELIMINARY RESULTS

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Introduction: Major breakthroughs in the treatment of strokes over the past 20 years are considered rTPA application and nothing less stroke units. Doubt about the contribution of the stroke units, was completely overcome by report of Cochrane Collaboration group. According to this analysis the specific organization of health care and patient care fundamentally has changed the outcome, both in terms of survival and by the functional improvement and independence. However, among many procedures of early rehabilitation, there is still uncertainty regarding very early mobilization (out-of-bed activity within 24 hours of stroke symptom onset). In order to gain their own experiences regarding early mobilization of stroke patients, an open-randomized study was initiated.

Materials and methods: Twelve subjects were drawn from consecutively admitted stroke patients of Department of Emergency Neurology Clinical Center of Serbia and randomized between very early rehabilitation (experimental group) vs. conventional rehabilitation procedures (control group). Experimental group was treated for two weeks after stroke at least twice per day; in addition to their usual care, 7 days per week. Physiologic monitoring of blood pressure, heart rate, oxygen saturation, and temperature before each mobilization within the first 3 days of stroke. In addition to safety outcome measures (death and/or number of serious adverse events at 3 months, falls) we have evaluated modified Rankin score (mRS) as measure of functional outcome at admission in clinic, at discharge and three months after stroke.

Results: Between the two groups of patients studied, previously carefully balanced in relation to stroke severity, significant differences are not observed, in terms of safety measures (adverse events) as well as in terms of the degree of motor function recovery 3 months after stroke, as measured by mRS.

Conclusions: Very early rehabilitation (including out of bed activities) for stroke patients within the first 24 hours is probably safe method, but it can not be confirmed because of very small number of patients tested. Further examination on large patients sample will provide us more reliable estimation about potential value of such treatment.

Key words: Stroke – rehabilitation – outcome

COMPLICATIONS DURING REHABILITATION OF PATIENTS WITH STROKE

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Introduction: Successful rehabilitation of patients after stroke is often accompanied by complications. They have long - term effects of real estate, reduced pulmonary ventilation, and pressure on body parts from the local blood circulation disorder, difficulty maintaining personal hygiene, exposure to the impact of uncontrolled urination and defecation, and a series of unfortunate circumstances that often accompany stroke, which have a positive effect on the occurrence of complications such as thrombosis, pneumonia, and pressure ulcers.

Materials and methods: We research a sample of 128 patients on rehabilitation after stroke in ZZMR “Dr Miroslav Zotović” in Banja Luka, during 4 month in 2013. We analyzed age, sex, type of stroke, neurological deficits by body sided, mobility at the beginning of treatment, independence in personal hygiene, the occurrence of dysphagia, urinary incontinence and loss of control of defecation. The occurrence of complications (thrombosis, pneumonia and pressure ulcers) at the beginning, middle and end of rehabilitation were analyzed.

Results: The average age of the sample was 66.78 years ($\pm 12:01$) in a range of 18 to 88 years. Up to 65 years of age was 38.3%, and 24.2 to 60% of the sample. Male gender was frequent than women. Rehabilitation after a stroke for up to 100 days began 75% of patients, a14, 1% of patients were included one year after stroke (repeated physical treatment). The most common type of stroke was ischemic stroke with 83.6%, followed by intracerebral hemorrhage with 8.6%, subarachnoid hemorrhage with 3, 9%, and other causes with 3.9% of the sample. With left-sided neurological deficits were 43.8%, right-sided 44.5% double-sided 11.7% of patients. Independently movable were 32.8%, moving with support 29.7% and 37.5% immobile patients.

The sample contained 45.3% of patients completely dependent on other people’s care and support, 26.6% partially dependent and 28.1% of patients independent. Swallowing disorder is present in 7.8% of patients. Speech and language impairments were registered at 33.6% of patients. 40.6% patients don’t have urination control and 14.8% defecation control. Thrombosis is not registered in any patient. On admission 5 patients had pressure ulcers. At one patient it was in beginning, and the other four have already developed. In the middle period of rehabilitation the same 5 patients had pressure ulcers, on the end of rehabilitation only 2 patients, the others were repaired. Four patients with pressure ulcers were in the category of immobile patients, and one in the category of moving with support. Four patients were totally dependent on other people’s care and support, and one was a partially dependent. Two totally dependent patients had not to repair pressure ulcers by the end of the rehabilitation period. On admission to rehabilitation is not registered neither pneumonia. Three patients during rehabilitation developed pneumonia, at two patients in the central part of the rehabilitation, and in one at the end of rehabilitation. Of these, two patients were in the category of fixed and one in the category movable with support. All three patients with pneumonia were totally dependent on other people’s care and support.

Conclusions: Complications during rehabilitation after stroke may be reduced to a minimum with good care and using appropriate methods of prevention. Age of a patient, personal hygiene maintenance and level of mobility were significantly related to occurrence of complications.

Key words: Stroke, complication, pressure ulcers, thrombosis, pneumonia, dependent on other people’s care and support

**BOTULINUM TOXIN FOR SPASTIC HAND IN LEFT MCA ISCHEMIC STROKE PATIENT
AFTER 20 YEARS OF EVOLUTION**

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Introduction: To demonstrate the effectiveness of treatment with Botulinum Toxin (BT) started after 20 years of evolution of MCA ischemic stroke in a 44 year - old patient with non - functional hand, aphasia, right hemiplegia and a non - functional hand.

Materials and methods: The clinical evaluation before the treatment showed spasticity in the right upper limb measured by the modified Ashworth Scale (MAS): elbow 3/4, wrist 2/4 pronator quadratus 2/4, thumb 3/4. The patient performed flexion and extension movements of the elbow and finger flexion with the thumb in palm deformity. The patient had the ability to pick up objects, but he wasn't able to release them (due to the thumb in palm deformity). BT was injected using 300U of Xeomin (incobotulinumtoxin A) distributed as follows: Biceps brachialis 100U, brachialis 50U, brachioradialis 50U, flexor carpi 50U, adductor pollicis 25U and opponens pollicis 25U.

Results: Nowadays, after the treatment, the patient's clinical evaluation shows at the right upper extremity a spasticity measured by MAS as follows: elbow 2/4, wrist 2/4, pronator quadratus 2/4 and thumb 2/4. The patient is able to extend all fingers; he also presents less thumb adduction and can grab and release objects. The patient has improved walking through the improvement of the elbow flexion synergy. He can also descend the stairs clutching the railing.

Conclusions: In this patient we have found the effectiveness of treatment despite the time elapsed since the stroke until we started with BT treatment, and the success of BT injections

Key words: Botulinum toxin, non-functional hand, 20 years stroke

PHYSICAL AND COGNITIVE IMPACT OF TRAUMATIC BRAIN INJURY

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Introduction: The Rehabilitation Network of Merseyside and Cheshire provides all specialist rehabilitation for patients with severe disability, including after traumatic brain injury (TBI), for a population of 2.4 million. This study examined the etiologies, duration of stay and physical and cognitive impairment observed following TBI.

Materials and methods: A case notes review was conducted for all patients admitted to the Walton Network Rehabilitation Unit (NRU) between July 2009 and April 2013 with a diagnosis of TBI. Information was collated from medical, nursing, therapy, psychology and imaging records on both etiology and the subsequent physical, cognitive and psychological impacts of TBI.

Results: There were 36 patients, 86% males, with median GCS 7 and median age of 41 years. Although only 53% of patients had frontal lobe lesions on imaging, 94% had cognitive deficits on assessment, and 67% had psychological problems requiring intervention. Median length of NRU stay was 63 days. Patients admitted earlier to rehabilitation ward had a shorter duration of stay, which was statistically significant ($r = 0.42$ CI 95% $0.07 < r < 0.68$). Improvement in Functional Independence Measure (FIM) scores positively correlated with increased length of stay at NRU ($R^2 = 0.271$, Pearson correlation coefficient ($r = 0.521$) and mean increase in score, from admission to discharge, was 33.2. Physical impairments of note included: reduced mobility (72%), spasticity (53%), urinary and bowel incontinence (47% & 19%) respectively, speech disturbance (69%), dysphagia (42%), cranial nerve damage (39%) and visual disturbance (19%). Psychological complications were reported in 23 patients (64%). The most common causes of TBI were falls (36%), assault (31%) and road traffic accidents (28%), with other causes such as sporting injuries accounting for the remaining (5%). Alcohol use was implicated in 22.2% of cases reviewed, with a further 5.6% of patients reporting a previous history of alcohol abuse.

Conclusion: Following severe TBI, most patients have cognitive, psychological and multiple physical disabilities. Our findings suggest that early rehabilitation following TBI may shorten the length of stay; further work is underway to see if this may be due to timely multidisciplinary treatment of these complex disabilities.

Key words: Traumatic Brain Injury, Neurorehabilitation, Acute rehabilitation

HYPOPITUITARISM AFTER TRAUMATIC BRAIN INJURY: CASE REPORT

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Introduction: TBI (traumatic brain injury) may frequently cause hypothalamic–pituitary dysfunction, contributing to a delayed recovery from TBI. Hypopituitarism can be a subclinical condition, identified only by hormonal tests, or its clinical manifestations can be acute and severe, pointing toward the need for immediate treatment. Clinical manifestations are variable depending of hormone affected. Those include apathy, muscle weakness and cognitive dysfunction, asthenia, cold intolerance (TSH deficiency with normal/low T4 due to secondary hypothyroidism), diabetes insipidus with polyuria, polydipsia, nocturia (secondary to antidiuretic hormone (ADH) insufficiency), fatigue, mood impairment, insomnia, loss of libido, impaired sexual function, loss of hair (FSH/LH, testosterone deficiency due to hypogonadism), hypotension (cortisol deficiency secondary to adrenal insufficiency).

Case Report: A 21-year-old man was referred to our centre for rehabilitation after 5 months severe TBI. He was in a confuse-agitated response state with severe impairment of cognition (attention, memory). In the initial assessment he had clinical polyuria, hypernatremia and low urinary osmolality. He also had normal T4 and low TSH level. Normal FSH and LH levels associated with high testosterone levels were founded. He was diagnosed hypopituitarism with diabetes insipidus, hypothyroidism and hypogonadism. He was initially treated with desmopressin intranasal 1 mcg/day and levothyroxine 0,05 mcg/day. During the first year bi-monthly routine assessment (thyroid function and electrolytes) were taken. 7 months after-TBI he was had one episode of mild hyponatremia (129 mmol/l) and low urinary osmolality (263 mOsm/kg) - he was placed on fluid restriction (1000 mL/day), suspended desmopressin, and had data normalization within 10 days. The patient resolved most of cognitive deficits, behaving appropriately in familiar settings and performing daily routines automatically.

Conclusions: The most post-TBI neuroendocrinopathies secondary to hypopituitarism include hypothyroidism, diabetes insipidus and hypogonadism. Diabetes insipidus is rarely permanent however in this case ADH replacement (desmopressin) was needed in the acute phase. In the follow-up he was diagnosed mild hyponatremia - fluid restriction and desmopressin suspension normalized data. Hypothyroidism was treated with levothyroxine. Treatment management was based by bi-monthly routine biochemical assessment. This case report reinforces the need for identification of hormonal deficiencies, proper treatment and routine biochemical assessment during the first year post-TBI, in order to optimize patient recovery, improve their life quality, and avoid the negative consequences of non-treated hypopituitarism in the long term.

Key words: Traumatic brain injury; hypopituitarism

ENDOCRINE COMPLICATIONS FOLLOWING BRAIN INJURY

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Introduction: The greatest challenge associated with endocrine complications in patients with brain injury (BI) is early recognition of these subtle problems. Endocrine complications can generate significant impact on the progress and outcome of BI rehabilitation. Prompt diagnosis and treatment of endocrine complications following BI facilitate the rehabilitation process of patients with BI. We aim to raise awareness of Brain injury induced Endocrinopathies and the need for appropriate Endocrinological testing.

Materials and methods: We present a case of 45 year old male patient who sustained high voltage electrocution injury, resulted in Ventricular Fibrillation (VT) cardiac arrest. His heart rhythm reversed to sinus rhythm after first cardiac resuscitation at the scene, but unfortunately he sustained hypoxic brain injury. He had computed tomography (CT) scan of brain that showed no evidence of intracranial contusion or haematoma, No abnormal mass effect or any gross cerebral oedema. He acquired burns to occipital region and left fingers. In first day after the incident He developed seizure and he was commenced on phenytoin. He had tracheostomy and Percutaneous Endoscopic Gastrostomy tube (PEG) inserted and he was transferred to rehabilitation centre. He had frequent episodes of autonomic dysfunction presenting with high temperature, tachycardia and sweating, these episodes were interfering him to engage in his rehabilitation program and needed through investigations. Lastly He was commenced on propranolol and his symptoms improved significantly. Regular blood monitoring showed evidence of electrolyte abnormality including Hyponatremia of 150 mMol/L, elevated Serum Osmolality 316 mosm/kg with Normal urine Osmolality, Normal urine sodium and Normal urine potassium. Pituitary function test including, testosterone, Cortisol, TSH, FT4, FSH and LH, Prolactin, IGF-1 were satisfactory.

Results: Patient reviewed by endocrinologist and he was diagnosed Isolated Diabetes Insipidus. His symptoms were managed successfully with regular water flushes through the PEG and Desmopressin.

Conclusions: Most post - BI endocrinopathies do not attribute to specific history patterns. Clinician should have higher suspicion to endocrinopathies if patient with brain injury had facial fractures, cranial nerve injuries, and dysautonomia. Routine basal Pituitary function testing should be performed on any patient who has been hospitalized with a BI and who has electrolyte abnormality. Prospectively, all patients who had a BI, regardless of its severity, should undergo a baseline hormonal evaluation 3 and 12 months after the primary brain injury. We recommend close collaboration between divisions of Endocrinology and Rehabilitation to facilitate screening for endocrinopathies in patients after BI.

Key words: Brain injury, Diabetes Insipidus, Hyponatremia, Endocrinopathy, Dysautonomia

THE CLINICAL CHALLENGE OF SYNDROME OF INNAPPROPRIATE ANTIDIURETIC HORMONE SECRETION - CASE REPORT

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Introduction: The greatest challenge associated with endocrine complications in individuals with traumatic brain injury (TBI) is early recognition on subtle problems. Syndrome of inappropriate antidiuretic hormone (SIADH) is the most common TBI-associated neuroendocrinopathy causing hyponatremia. Almost all cases resolve spontaneously with recovery from brain injury. Clinical evaluation may be difficult because of confounding deficits, so the clinician should have a high index of suspicion. Uncorrected endocrine disorders may limit cognitive and behavioral recovery and lead to serious physical sequelae. The lack of agreement on which endocrine abnormalities are most common unfortunately precludes the development of a simple screening strategy. Differentiation from others causes such as cerebral salt-wasting (CSW) syndrome, hypothyroidism or ACTH deficiency can be challenging. However distinguish them is important because treatment options differ. The management of SIADH-induced euvoalaemic hyponatraemia has traditionally been fluid restriction.

Below, we present one case study to illustrate the current challenges of SIADH.

Case Report: A 59-year-old man was referred to our rehabilitation center for rehabilitation 6 months after severe TBI (subarachnoid haemorrhage, complicated with intracranial hypertension, seizures and submitted cranioplasty complicated with cerebral contusion immediately before the admission). He had been diagnosed 2 months evolution hyponatremia. In the initial assessment he turned out to have hyponatraemia of 113 mmol/L. In an additional work-up CSW, primary polydipsia, inappropriate fluid hypothyroidism, diabetes insipidus and medication were excluded. Therefore, based on clinical euvoalaemia and the biochemical data (low urinary osmolality 238mOsm/kg; decreased plasma uric acid 1,04 mg/dl and normal plasma potassium 5,36 mmol/L) the working diagnosis was SIADH secondary to TBI. He was placed on fluid restriction (1000 mL/day), furosemida 40mg/day and salt dietary supplement (4g/day), which increased serum sodium to 133 mmol/L in 7 days. The treatment lasted 3 months, with normalization of the biochemical data.

Conclusions: Hyponatraemia is the commonest electrolyte imbalance in rehabilitation center inpatients, and it is associated with large and significant morbidity and mortality. We have adopted a pragmatic approach to hyponatraemia, in which classification of causation is based on clinical and biochemical estimation of extracellular volume status. This divides hyponatraemia into hypovolaemic, euvoalaemic and hypervolaemic aetiologies. A policy of routine inclusion of measurement of thyroid hormones, urinary osmolality, plasma uric acid in all patients with apparent SIADH due to neurosurgical conditions such as traumatic brain injury, subarachnoid haemorrhage, should be adopted.

Key words: Traumatic brain injury; hyponatremia; syndrome of inappropriate antidiuretic hormone

DYSPHONIA AS A PRIMARY MANIFESTATION IN MYASTHENIA GRAVIS: A CASE REPORT

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Introduction: Myasthenia Gravis (MG) is a chronic autoimmune disease caused by a defect in neuromuscular transmission owing to an antibody-mediated attack on acetylcholine receptors at neuromuscular junctions, and that is characterized by fluctuating weakness and abnormal fatigability of muscles. The incidence is about 1/100.000 cases in the general population. Also, 1/3 are presented in the elderly population. Usually is recognized with ocular complaints or generalized muscle weakness because the fatigability of peripheral skeletal muscle is the hallmark of the disease. But it can be absent in the bulbar forms, being dysphonia and dysphagia the most common manifestations. So, dysphonia is an atypical and relatively rare onset of MG. Also, MG is a masquerader in elderly persons, as the symptoms can be mistaken for age-associated changes or another acute morbid condition. This two facts can difficult the diagnosis. Electrophysiological evaluation, laboratory studies and anticholinesterase agent test (using edrophonium, neostigmine or pyridostigmine) can confirm the diagnosis. Conventional treatment is based on oral pyridostigmine. Response can be less satisfactory in elderly patients. Moreover, thymomas are more common in this population. So they present higher morbidity and mortality, being necessary an exhaustive screening.

Materials and methods: A case whose initial and prominent complaint was dysphonia and that was misdiagnosed is presented to alert the clinician to the fact that voice changes can be the first and only sign of neurologic disease. Our case involves a 73-year-old woman who had been suffering from nasal speech and chronic hoarseness for two years. No associated symptoms such as limb weakness or respiratory and ocular problems were described. Her past medical history was unremarkable except for hypertension. She was cognitively intact and independent in activities of daily living.

Results: Flexible fibroendoscopic examination did not reveal significant anomalies, and the computer tomography scan of cavum was normal. Then, she was referred for phoniatric assesment. Tongue weakness and palate muscle paralysis, as well as absence of gag and palatal reflex were observed. No chewing problems were related. Suspecting a neurological disease, further studies were performed. Laboratory studies revealed an acetylcholine receptor antibody test positive at 15.9 mmol/L (normal range 0.0 to 0.2). Single-fiber electromyography was normal. A repetitive stimulatory test of the left facial nerve, which response was recorded from the *orbicularis oculi* muscle, showed a pathological decrement of amplitude in the baseline and post-exercise studies. No thymoma was found. As a result, based on dysphonia, higher level of circulating antibody to acetylcholine receptor and typical electrophysiologic changes, a diagnosis of MG could be made definitively. A treatment with oral pyridostigmine 60 mg 4 times a day was started. At follow-up 6 months later, she was completely asymptomatic.

Conclusions: Patients with dysphonia as their initial symptom of MG may complain of vocal fatigue, difficulty sustaining or projecting their voices, breathy voice or intermittent hoarseness. Because of confusion with signs of the aging process or from age-related comorbidities, it has been suggested that MG might be underdiagnosed or misdiagnosed in older people. So, a possible diagnosis of MG should be taken into consideration in cases with isolated dysphonic signs of uncertain origin.

Key words: myasthenia gravis; dysphonia; dysphagia

STATIN USE AND RISK OF AMYOTROPHIC LATERAL SCLEROSIS

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Introduction: HMG-CoA reductase inhibitor drugs (statins) are well known causes for Myalgias, and may result in elevated serum Creatine Phosphate Kinase (CPK) levels, myopathy, and even rhabdomyolysis. The use of statins however has rarely been reported for being associated with neuromuscular degenerative disease and amyotrophic lateral sclerosis (ALS). Here we present a case of ALS to raise awareness of this association.

Materials and methods: We report a 70 year old retired male patient, who presented with gradual weakness of his legs; he had previous history of Myocardial Infarction and was taking Atorvastatin, Aspirin, Ramipril and Omacor. He was seen in outpatient clinic and initial examination showed reduced power in hip flexors (right more left), with normal tone and normal reflexes. Blood investigations revealed significantly elevated CPK (2403IU/Litre); Diagnosis of myopathy secondary to statin usage was made and he was advised to discontinue Atorvastatin. After one month, his repeat CPK was 1500IU/L. Two months later he acknowledged that his symptoms were worsening despite discontinuation of statin. Clinical examination revealed further weakness in his lower limbs again more significant in right side with normal tone and reflexes. Repeat CPK came back at 1800IU/L. Further investigation including Muscle Biopsy and Electromyography (EMG) were arranged, Muscle Biopsy excluded myositis and vasculitis. MRI scan showed oedematous muscle in lower limbs. EMG showed neurogenic changes with fibrillation potential suggesting anterior horn cell disease.

Results: Patient was referred to the Neurologist and was diagnosed as having ALS. He was commenced on Riluzole. Unfortunately Patient died 7 months after his initial presentation. The cause of death was type two respiratory failure secondary to ALS.

Conclusions: In cases of statin induced Myopathy, elevated CPK levels can take months to resolve after statin withdrawal. Studies indicate that any risk of ALS associated with statin use is probably small, however, this case demonstrates that in cases of prolonged persistence of symptoms and elevated CPK, clinicians should be aware of underlying muscle or nerve disorder that statin exposure may have uncovered. We suggest that neurological consultation should be considered to evaluate for an underlying neurological disorder if neuromuscular symptoms do not respond within a few months of statin withdrawal.

Key words: Statin, Amyotrophic lateral sclerosis, Myopathy

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**PATIENTS WITH THE MARFAN SYNDROME AND CEREBRAL STROKE: NOT AN ODD
COUPLE**

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Two young patients, male and female, with mild cerebral stroke, were admitted to our Department of Rehabilitation Medicine. They were known to suffer from the Marfan Syndrome. This association is relatively rare, and apart of the clinical course, the literature review will be given.

**THE ROLE OF EARLY REHABILITATION AFTER OPERATION OF ANEURYSMAL
SUBARAHNOID HEMORRHAGE IN ACUTE TERM**

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Introduction Early rehabilitation consists of measures which are taken at an early stage of a disease or injury, with the aim to prevent development of complications of organ systems caused by the illness or prolonged bed rest. Consequences of subarachnoid hemorrhage (SAH) are motor and cognitive lesions, which cause social and work-related impairment and influence the quality of life, as well as social integrity of the patient. Cognitive function is associated with a poor functional recovery and lower quality of life. There are no data indicating the best moment to start early rehabilitation after acute period surgery of aneurysmal hemorrhaging. The Clinic for Physical and Rehabilitation Medicine of Clinical Center of Serbia uses specific algorithms for rehabilitation of patients after acute period surgery of aneurysmal hemorrhaging.

The aim of the study was to investigate the effects of early rehabilitation of patients after acute period surgery of subarachnoid aneurysmal hemorrhage.

Materials and methods A 62 years old female patient felt a severe headache in early morning hours, followed by nausea and vomiting. The patient was examined in Emergency Center by a neurologist and a neurosurgeon since she was suspected of SAH. The patient was admitted to the hospital the same day. Personal anamnesis was negative.

Results Patient was operated in acute period of aneurysmal SAH, and rehabilitation was conducted according to the algorithm for acute period surgeries. On the first postoperative day the patient had stable vital parameters, and she was administered drug therapy, the patient showed no neurologic deficits from the 1st to 9th day from attack: resting (without kinezytherapy because of the possibility of vasospasm occurrence), prevention of deep vein thrombosis, elevation of the upper body (30 – 45 degrees). The same condition and the same rehabilitation treatment continued until the 11th day from the attack. After that, bed exercises and controlled verticalization (sitting with elastic bandages on lower limbs) were started. On the twelfth day from the attack, all the procedures were repeated and further verticalization continued (standing, walking). In the beginning the patient was walking with therapists for two days, and after that period independently under supervision of therapists. Score of FIM test was 126. MMSE 30.

Conclusions: Right time procedures at early stage, individually and with the adequate concept of physical therapy influence prevention of complications, as well as functional rehabilitation of patient to the great extent.

Key words: Early rehabilitation, acute period, SAH, verticalisation

FEVER OF CENTRAL ORIGIN TREATED WITH PROPRANOLOL IN HAEMORRHAGIC STROKE. A CASE REPORT

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Introduction: Fever appears approximately in 25% of stroke. Its origin - usually infectious - is unknown in a minority of the cases. Neurogenic fever results from a disruption in the hypothalamic set point temperature, probably due to central mechanisms like hypothalamic lesions or segregation of endogenous pyrogens, causing an abnormal increase in body temperature. Many drugs have successfully been used to treat neurogenic fever, like bromocriptine, amantadine, dantrolene and propranolol. The authors describe a clinical case of neurogenic fever in a hemorrhagic stroke successfully controlled with propranolol.

Materials and methods: Consultation of clinical process data from a patient with hemorrhagic stroke admitted to a rehabilitation center.

Results: 25 year old Caucasian male with a past clinical history of hemorrhagic stroke and spastic tetraplegia 9 months prior referral to our Rehabilitation Center. He had been treated with propranolol, 120 mg/day, in the previous medical care facility but the clinical data did not allow the explaining why he was taking such medication. We tried to reduce this medication in order to improve lethargy and lentification as he had normal vital signs. 2 days after reducing propranolol to a lower dose (60 mg/day), the patient developed fever (38°C). He showed no signs of infection on the physical examination, had normal red and white blood cell counts, hepatic and kidney function, normal chest X-ray and urinalysis. We assumed that fever could have been caused by a central mechanism, was and we increased propranolol to its initial dosage (120 mg/day). After only one day of pharmacological adjustment, the fever ceased.

Conclusions: Fever in stroke and traumatic brain injuries without documented infection may have central origin. This type of fever has a defined model with its own characteristics, in a different way from infectious fever. Propranolol can play an important role to control central fever and consequent injuries due to high core temperatures in patients with stroke.

Key words: Propranolol, haemorrhagic stroke

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REHABILITATION TREATMENT OF PATIENT WITH BROWN SEQUARD SYNDROMA AND PTSD CAUSED BY DOMESTIC VIOLENCE – CASE REPORT

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Introduction: Brown Sequard syndrome (BSS) is rare neurological condition characterised by an incomplete spinal cord lesion which results in ipsilateral weakness or paralysis of the body and loss of pain and temperature on the opposite side. It may be caused by spinal cord trauma (fracture, stab wound, tumor).

Objective: To present the team work necessity in the rehabilitation patient with the Brown Sequard syndrome and PTSD caused by domestic violence.

Patient: 73 years old woman, victim of domestic violence, admitted on rehabilitation treatment with paralysis of the left side of the body caused by axe wound on the left side of her neck and multifragmental fracture of the 4th vertebra of cervical spine. Clinical examination on the beginning of the rehabilitation: Neck was immobilised by cervical orthosis, with a very poor and painful movements. Left side of the body was paralysed, flaccid, without any voluntary movement. On the right side of the body there were no pain sensations. Patient was not able to walk and had no ability to transfer from lying to sitting position without assistance of other person, but maintained balance in sitting position. She was anxious, had night terrors and „flash backs“, and diagnosed PTSD by psychiatrist.

Methods: From the beginning of the treatment all members of the rehabilitation team (doctors, nurses, physiotherapist, occupational therapist, psychologist, somatoped, social worker and family) were involved. Her daughters were included in psycho-social support programme.

Results: Three months later patient was discharged in much better condition. She had voluntary movements in the left hip, knee and ankle and walked without assistance. There were voluntary movements in the hand, but shoulder and elbow were still immobile. PTSD was significantly reduced.

Conclusion: Participation and mutual efforts of rehabilitation team members, together with members of patient's family, resulted in the significant motor and mental recovery of the patient who suffered of BSS and PTSD caused by domestic violence.

Key words: team work, BSS, violence

RASMUSSEN ENCEPHALITIS (A CASE REPORT)

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Introduction: Rasmussen's encephalitis is a rare, chronic inflammatory neurological disease that usually affects only one hemisphere of the brain. It usually occurs in children under the age of 10 (more rarely in adolescents and adults), and is characterized by frequent and severe seizures, loss of motor skills and speech, paralysis on one side of the body (hemiparesis), inflammation of the brain (encephalitis), and mental deterioration. The objective of this paper is to show the usefulness of physical therapy in treatment Rasmussen encephalitis.

Materials and methods: Female patient named K.S., 24 years old, right hand dominance. Perinatal history is unremarkable. No prodromal period. Epilepsy started acutely on March the 18th, 2013. like acute occurrence of twitching of index finger and thumb of the left hand. Progression of seizures during 28 months: Very frequent and violent tonic-clonic seizures of left arm, left part of the neck and left side of face, till 20 seizures daily. Immune modifying therapy with steroids, plasmapheresis and antiepileptic drug therapy did not give any improve results. Final choice of therapy: Right hemispherectomy on February 4th, 2013. Postoperative riddance from seizures with the expected neurological deficits. In our institution patient was treated during 21 days. Clinical state at admission to our hospital: ranges with adherence, paretic scheme of walking, left knee in recurvation, the Romberg unstable with a tendency to fall to the left. In the left upper extremity with no active movement. Bartel index 58 (severe dependence). The psychological profile of reduced volitional dynamism. Rating by Hamilton Depression Rating Scale 15 (middle level).

Results: The results after completion of complex medical rehabilitation: More stable during walking, in left hand improved range of active movement, mostly at the level of the shoulder and elbow, and in left leg at the level of the knee. Bartel index 76 (moderate dependence: self dressing, transfer and climbing stairs). The psychological profile showy evident improvement: willing urge is improved-according to Hamilton scale 10-mild depression).

Conclusions: Although the surgery was a final solution for stopping persistent seizures, as a result in the clinical state, however remained higher neurological deficit than before. Accordingly, the process of physical medical rehabilitation is a very important segment of the final treatment to improve the quality of everyday life.

Keywords: Rasmussen, encephalitis, seizures, paresis, rehabilitation

IMPORTANCE OF COMPLEX APPROACH IN REHABILITATION OF PATIENT WITH ANOREXIA PSYCHOSIS

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Introduction: Anorexia psychosis is a mental disorder in which a person keeps reducing food intake, leading to heavy exhaustion of one's body and real life-threatening situation, when weight is 25% less than usual. In Western European countries, there has been more and more talking about epidemic of this disorder. Cause of this illness is multifactorial, videlicet, it is conditioned by biological, sociological and psychological factors. The cause cannot be brought down to the effect of a single factor. Otherwise, treatment would be simple and prognosis wouldn't be so severe and uncertain. Practically, disease occurs in the specific origination of bio – psycho – social components. Therapy is the integration of the knowledge of a team and the interventions undertaken, with a certain regularity adjusted to a given patient.

Patient, 21 years old, is a student admitted to inpatient rehabilitation in the state of tetraplegia, caused by anorexia psychosis, facies hypocratica, immobile, with no active movements in upper/ lower extremities, speech in the form of alalia, with no response to orders. During the process of rehabilitation, patient was involved in the work of the whole rehabilitation team (physiatrist, physical therapist, occupational therapist, nurse, special rehabilitation pathologist, speech therapist, psychologist, social worker). Therapeutic results were continuously evaluated in terms of motor skills, speech, psychomotor skills, behavior and social adaptation of the patient, whereby, all team members were contributing, each in their area of expertise.

Materials and method: For diagnostic evaluation and monitoring of the progress of the patient, when working with a patient, tests were used to assess motor index, Barthel index, scale for the assessment of psychomotor organization and Boston Diagnostic Aphasia Examination. In addition to tests, physical procedures were carried out, as well as occupational therapy, hydrotherapy, psychomotor re-education therapy, speech therapy exercises and psychosocial therapy.

Results: Rehabilitation treatment, which with intermittent lasted 2.5 years, resulted in significant motor recovery, reduction of disability in terms of ADL (Activities of Daily Living), as confirmed by Barthel index, which is the beginning of the treatment had a score of 0, indicating complete functional disability, and the final test shows the total score of 97 which indicates complete independence in all aspects of life, including the continuation of study in college. Assessment of psychomotor organization totaled indicates a complete mismatch of PM structures, and the final test indicates the lower limit of the normal range. Boston Diagnostic Aphasia Examination on the first estimate was under below normal values, unproductive and disabled speech, on the last and supports the significant progress in the area of speech production for normal productive verbal communications with mild dysarthria elements.

Conclusions: The results achieved in the rehabilitation of the young patient with severe motor deficits in terms of tetraplegia and psychosomatic disorders occurring as a result of anorexia psychosis, are achieved by engaging a multidisciplinary team. The importance of complex approach to rehabilitation lies in achieving a higher level of independent living and integration of the patient in all aspects of life.

Key words: anorexia psychosis, complex rehabilitation, a multidisciplinary team

IS THE PHYSICAL EXAMINATION SUFFICIENT FOR THE DIAGNOSIS OF CARPAL TUNNEL SYNDROME?

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Introduction Carpal tunnel syndrome is the most common entrapment neuropathy of upper extremities. The diagnosis is usually based on the patient's history and physical examination. The golden standard for diagnosis of median nerve compression is electromyoneurography (EMNG). The aim of this study was to assess diagnostic accuracy (sensitivity, specificity, positive and negative predictive values, and area under the ROC curve) of clinical symptoms and signs - "flick sign", Tinel and Phalen sign for the diagnosis of carpal tunnel syndrome in relation to EMNG finding.

Materials and methods Prospective study included 79 patients (70 females and 9 males), mean age 56 ± 10.6 years, who had EMNG confirmed compressive lesions of median nerve of at least one hand. EMNG was preceded by history (evidence of "flick sign" - this refers to asking the patients what they do with the hand at night when they experience symptoms. If the patient demonstrates a 'shaking out' movement of flicking the wrists then the sign is positive) and physical examination, which included, provocative tests Phalen (tingling in the median nerve distribution induced by full flexion of the wrists for up to 60 seconds) and Tinel (gentle tapping over the median nerve in the carpal tunnel region elicits tingling in the nerve's distribution). EMNG finding was considered positive if the prolonged terminal latency of the motor and/or sensitive median nerve and/or reduced sensory conduction velocities of median nerve are observed. Data were statistically analyzed by using SPSS 16 for Windows.

Results : Characteristic EMNG findings for carpal tunnel syndrome were found in 131 hands in 79 patients. Compared with EMNG test we found that sensitivity of "flick sign" for the diagnosis of carpal tunnel syndrome was 78%, specificity (Sp) 81%, positive predictive value (PPV) 95%, negative predictive value (NPV) 43%, and area under the ROC curve 0.797. Tinel's sign had Sn 64%, Sp 85%, PPV 95%, NPV 33% and the calculated area under the ROC curve was 0.747. Sensitivity of Phalen sign was 77%, Sp 70%, PPV 93%, NPV 39% and the area under the ROC curve 0.737. The specificity and PPV of the simultaneous presence of all three signs was 100%, with 45% Sn and NPV 27% and area under the ROC curve 0.725.

Conclusions "Flick sign", Tinel and Phalen signs are individually equally sensitive and specific indicators of median nerve entrapment, but the definitive diagnosis still requires EMNG review. The simultaneous presence of all three clinical signs is sufficient for the diagnosis of carpal tunnel syndrome and the initiation of a treatment.

Key words carpal tunnel syndrome, electromyoneurography, "Flick sign", Tinel sign, Phalen sign

OBTURATOR NEUROPATHY. CASE REPORT

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Introduction: Obturator neuropathy (ON) is a difficult clinical problem to evaluate. Symptoms include medial thigh or groin pain, weakness with leg adduction, and sensory loss in the medial thigh of the affected side. The best test for diagnosis is by electromyography (EMG). Pharmacologic management of pain and physical therapy can be helpful in the acute phase of injury. Obturator neuropathy is a rare condition that may result from orthopedic, gynecological, or urological procedures, tumor compression or sports-related injuries.

Materials and methods: A 63-year-old man was remitted by Urology for proximal weakness in his right leg. He had been diagnosed of high-grade bladder carcinoma (Broders III-IV) in 2008, and underwent bladder transurethral resection. Tumor recurrence was observed in a recent control CT scan, and radical cystoprostatectomy and a Bricker's cutaneous uretero-ileostomy was performed. During the intervention the patient had a lithotomic position for several hours.

He complained of weakness in his right thigh which prevented him from driving. Exploration highlighted muscular balance of thigh adductors 2/5, and light sensory loss in the proximal medial thigh. Obturator neuropathy was suspected and further on confirmed by EMG. Rehabilitation treatment was implemented, which included neurostimulation and therapeutic exercise to improve muscular strength of the adductors. Four months after surgery the recovery was complete.

Results: The lithotomic position in long surgical procedures may be one of the factors causing a lesion by compression of the obturator nerve. Groin pain and sensory loss in the medial thigh are the most common clinical manifestation of obturator neuropathy, but in our patient the most worrying symptom was the paresis of adductors. We emphasized the incapacity of driving caused by the neuropathy to our patient, (because the accelerator and brake pedals are managed by the right leg), which was recovered at the end of the rehabilitation treatment.

Conclusions: Obturator neuropathy is a rare complication after urological procedures, being one of the causes the compression of the nerve by a prolonged lithotomic position. Conservative treatment (analgesic and physical therapy) is the treatment of election. Surgical approach should be considered in cases of refractory pain or motor deficit of the adductor muscle after failure of conservative treatment.

Key words: Obturator neuropathy, cystectomy, rehabilitation

LATERAL FEMORAL CUTANEOUS NERVE INJURY AFTER ABDOMINOPLASTY: CASE PRESENTATION

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Introduction: The lateral femoral cutaneous nerve is a purely sensory nerve, originating from the L2 and L3 spinal roots and supplying the skin over the anterolateral surface of the thigh. Entrapment neuropathy of this nerve is known as meralgia paresthetica. It may be idiopathic, but causes include pregnancy, obesity, or tight clothing or seat belt. Other possible causes include factors such as bone graft using iliac bone, pelvic surgery, inguinal hernia repair, trauma, abdominal mass and metabolic or toxic diseases. Regardless of the etiology, a lateral femoral cutaneous nerve lesion causes burning pain and paresthesia in the anterolateral thigh, which is the innervation area of the nerve. It may be confused with lumbar radiculopathy and hip problems due to location of the pain.

Case: A 44-year-old female patient presented to our outpatients with symptoms of pain and paresthesia on the upper outer part of the left thigh. Her history revealed that her symptoms had started after abdominoplasty surgery performed a month ago, and the symptoms increased with standing and walking. Her medical history had nothing of significance except for the abdominoplasty surgery that had performed for obesity. Physical examination revealed hypoesthesia in the left lateral femoral cutaneous sensory distribution area. In the electrodiagnostic studies, the lateral femoral cutaneous sensory nerve action potential amplitudes could not be obtained. Other nerve conduction studies were normal range. No evidence supporting lumbar radiculopathy was found on needle electromyography. The cortical somatosensory evoked potential (SEP) response latencies obtained with left lateral femoral cutaneous nerve distribution area stimulation were delayed and had smaller amplitudes than in the right in the SEP study. These findings were consistent with left lateral femoral cutaneous nerve injury and gabapentin 2400 mg/day was started after dose titration.

Conclusions: Lateral femoral cutaneous nerve damage is usually idiopathic but may develop in an iatrogenic manner after surgical procedures and may be confused especially with low back pain and hip problems. It should be considered in symptoms related to the anterolateral aspect of the thigh. It can usually be treated with simple recommendations and treatment methods.

Key words: Lateral femoral cutaneous nerve, abdominoplasty, meralgia paresthetica

IATROGENIC SPINAL ACCESSORY NERVE PALSY: A CASE REPORT

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Introduction: The spinal accessory nerve (SAN) is the pure motor innervation to the trapezius and sternocleidomastoid (SCM) muscles. The trapezius muscle is one of the major muscles that stabilize the scapula during rotation, elevating the upper limb and retracting the scapula. Consequently, SAN palsy causes weakness of the trapezius muscle. The patient usually has a dropping shoulder, winging of the scapula, and weakness during forward elevation. The occurrence of SCM muscle palsy is rare, and leads to weakness of contralateral rotation of the neck. We present a case with iatrogenic SAN palsy.

Case: A 30-year-old female presented to our outpatient with symptoms of pain on the right shoulder and difficulty in overhead activities over a three - month period. She expressed having been operated for papillary thyroid carcinoma three months ago in her history and the symptoms had started after the operation. She had undergone bilateral total thyroidectomy and right modified radical neck dissection for the papillary thyroid carcinoma. Her physical examination revealed a dropped right shoulder and atrophic appearance in the upper part of the trapezius muscle. Rotation of the neck to the left was restricted and the right SCM muscle was short and tense. Passive shoulder joint range of motion was full. She completed active shoulder abduction in the right with great difficulty after 90 degrees and winging of the right scapula was seen during abduction. Neurological examination revealed a mild to moderate loss of strength in the right trapezius and SCM muscles. Nerve conduction study of the SANs showed low amplitude and prolonged latency of nerve potential on the right side when compared with the left side. Other nerve conduction studies in the upper extremities were normal. An increase in mild contraction polyphasic motor unit potentials and decrease in full contraction recruitment pattern in the right upper trapezius and SCM muscles were observed during needle electromyography (EMG). No abnormal finding was found with needle EMGs of the right infraspinatus, serratus anterior, levator scapulae, rhomboid major, and deltoid muscles. These findings were consistent with a partial lesion of the spinal accessory nerve proximal to the SCM muscle innervation. The patient was administered 14 sessions of a physical therapy program consisting of electrical stimulation to the trapezius muscle, progressive strengthening exercises, posture exercises, and joint range of motion and stretching exercises.

Conclusions: Iatrogenic SAN lesions after surgical procedures such as lymph node biopsy, neck dissection, and carotid endarterectomy are the most common causes for this type of nerve palsy. Early diagnosis is usually delayed because the indefinite clinical signs such as atrophy of the trapezius muscle are not easily visualized at early clinical inspection. We therefore wanted to emphasize the importance of a detailed history and physical examination during the evaluation of patients presenting with shoulder pain. SAN palsy should be considered in the differential diagnosis in the presence of a history of surgical intervention, especially in the neck region.

Key words: Spinal accessory palsy, iatrogenic, neck dissection

THE EFFECTS OF LOW LEVEL LASER THERAPY IN FACIAL NERVE PALSY

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Introduction: Bell's palsy is defined as an idiopathic peripheral facial nerve paralysis of sudden onset and it is considered the most common cause of facial nerve paralysis. The aim of this study was to evaluate clinical effects of low level laser therapy compared with various physical therapy modalities on functional outcome following idiopathic facial palsy.

Materials and method: Between January 2009 and March 2013, 32 patients with severe facial palsy (House Brackmann grading score V or VI) were referred to the Specialized Hospital for Rehabilitation Bukovička Banja of Aranđelovac. All the patients were observed by neurologist and ENT specialist before starting rehabilitation. Majority of them (90%) underwent pharmacological treatments with glucocorticoid drugs. They were separated into two groups. Group I consisted of 16 patients aged between 21 and 77 (average age 46) that received LLLT (wavelength 820 nm) applied in projection of stylomastoid foramen in stationary skin contact method (frequency 2500 Hz, energy density 1.0 J/cm²) and along main facial nerve branches at the affected side (fr. 80Hz, energy density 0.5 J / cm² per point up to 20 points), five times a week, 15 to 25 sessions depending on response to treatment. Group II consisted of 16 patients aged between 22 and 76 (average age 50) who received various forms of physical therapy modalities such as electrotherapy, kinesiotherapy, superficial heat therapy. The time between onset of symptoms and rehabilitation ranged between 2 - 7 days (mean 5). Facial nerve recovery was clinically evaluated according to the House Brackmann grading system. Follow up was done once a week during a first month and subsequently once a two weeks until recovery was done or in a case with incomplete recovery with defective healing until patients did not show any improvement for a further of 4 months.

Results: Results were analyzed by appropriate descriptive and analytical statistical methods (mean, SD, Min, Max, Mann-Whitney test). Both groups showed improvement in facial muscle function. The facial nerve score after 4 weeks of treatment was significantly more severe ($p < 0.001$) in the control group compared to the LLLT group. Complete recovery was observed in all patients in LLLT group opposite to 75 % in control group ($p > 0.05$). The time required for complete recovery of facial nerve function was significantly shorter ($p < 0.001$) in the LLLT group than in control group.

Conclusions: It can be concluded that LLLT shows beneficial effects in recovery of facial nerve function reducing the time of paralysis.

Key words: LLLT, facial palsy, House Brackmann

PLACEBO AS A SPECIFIC THERAPEUTIC APPROACH IN PHYSICAL MEDICINE AND REHABILITATION

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This study includes modern research and the latest views on one of the most controversial medical aspects – the placebo effect. Even though more than a century has passed since this term was introduced to modern medicine, the placebo effect is still not fully understood. We can say that today there isn't a medical branch where the placebo effect is not present, as with pharmacological medication, in medical procedures that can also have placebo effect (ECT, surgery, stimulation on non-acupuncture spots). Several factors have great importance due to their influence on the placebo, such as cultural, specific characteristics of the patient's personality, his expectations, characteristics of the therapist, the nature of the therapeutic procedure, also the existence of people who are susceptible to the placebo effect. The possibility of recognizing these patients with laboratory methods has been considered. Placebo is representative and efficient in treating some forms of depression, and in the treatment of pain. The placebo effect and its research are an important topic in modern clinical trials.

Keywords: placebo effect, nocebo effect, characteristics of personality

MELKERSSON - ROSENTHAL SYNDROME: A CASE REPORT AND LITERATURE REVIEW

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Introduction: Melkersson-Rosenthal Syndrome (MRS) is a rare neuromucocutaneous disorder, consisting of a triad of persistent or recurrent orofacial edema, relapsing facial paralysis and fissured tongue. As the etiology remains unknown, diagnosis and treatment of MRS is challenging. The purpose of this work is to report a clinical case and to discuss the etiopathogenesis, clinical features, differential diagnosis and treatment options for MRS. Awareness of this syndrome should enhance our clinical acumen and enable an improved assessment of this disorder.

Material and methods: A literature review was performed in order to assess the course of symptoms, differential diagnosis, histopathological findings, treatment and follow-up recommendations for patients with MRS.

The authors report a clinical case of a patient with the classic triad of MRS.

Results/Discussion: The authors present a twenty-one years old female patient with a complete right lower motor neuron facial nerve paralysis (FNP) and facial edema with a fissured tongue. There was no history of systemic symptoms, trauma or past/recent injuries. Laboratory findings were normal. The patient was medicated with oral corticosteroids (CT), eye protection measures and started a rehabilitation treatment. This was the patient's third episode of FNP. All the episodes affected alternating sides of the face. At the age of eleven, she had the first episode, which was diagnosed as Bell's palsy. She was medicated with CT and attended a rehabilitation program with full recovery. There was no family history of MRS. The case described fits within the classic triad of MRS. The complete triad of symptoms is uncommon, varying from 8 to 25%. The most frequent complaint of MRS is facial edema and enlargement of the lips. FNP occurs least often and is indistinguishable from a classic Bell's Palsy.

The etiology of MRS remains unclear and the diagnosis is essentially clinical. In a patient with persistent or recurrent orofacial edema, the presence of at least one of the findings of idiopathic FNP or lingua plicata is sufficient to make definitive diagnosis of MRS. However, biopsy may help to diagnose MRS and to exclude Crohn's disease and sarcoidosis. In this case, there was no evidence of other associated disorders, so the diagnosis of MRS was made.

In this literature review we found scarce information about the prognosis of MRS. Many studies claim that, over time, some findings may become permanent. Treatment of MRS seems to be difficult, mainly because the etiology remains unknown and it is probably connected with a pathogenetic background. The treatment approach of facial palsy should follow the same principles used in Bell's palsy. However, a prophylactic decompression to prevent recurrent FNP may be considered.

Conclusions: The MRS may present over the course of most of the lifespan and may require several years of observation to be diagnosed. With the disease progression, the FNP episodes become more frequent and lasting, and may cause residual paresis and syncinesis. Physiatriests should consider the diagnoses of MRS in the presence of any recurrent FNP and/or chronic facial swelling. Comprehensive approach in differential diagnosis of FNP is highlighted, in order to avoid misdiagnosis and to provide prompt treatment planning with better prognosis. Therefore, we recommend a pluridisciplinary evaluation of MRS's patients with a regular follow-up.

Key-words: melkersson-rosenthal; syndrome; facial palsy

PREDICTIV VELUES OF C - REACTIVE PROTEIN IN DETECTION OF CORONARY HEART DISEASE IN PATIENTS WITH POSITIVE ERGOMETRI

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The main role in originate, development and evolution of atherosclerotic lesion have inflammatory response. It is believed that the high-sensitivity C-reactive protein (hs-CRP) is indicator of acute inflammatory answer. Hs-CRP has a long plasma half-life and is now understood to be a mediator as well as marker of atherothrombotic disease.

Purpose of this study was to investigate whether measurement of high-sensitivity C-reactive protein could be of help to predict stres induced myocardial ischemia and in evaluation of atherosclerosis.

Methods: Study included 122 patients (91 male and 31 female) average age of 57 ± 7 , who had chest pain. Patients who had acute and chronic inflammatory disease, were excluded from the study. All patients underwent measuring lipid status (total cholesterol, low-density lipoprotein cholesterol and high-density lipoprotein cholesterol) and nonlipid risk factors (body mass index, smoking, diabetes, hypertension and fibrinogen). The first samples of hs-CRP were collected before ergometri and second samples 24 hour after ergometri. Patients were divided in two groups according of positively ergometri. 32 patients with positive ergometri undergo coronary angiography.

Results: In first group with negative ergometri there were 78 patients and the second group had 44 patients with positive ergometri. We had statistical significance different in lipid status between groups only on high-density lipoprotein cholesterol ($p < 0,05$). So, there was no difference in hs-CRP level within the same group, but there was significance different between the groups before and after the ergometri ($p < 0,05$). In the group with positive ergometri, coronary angiography find was next: 8 patients had one-vessel, 14 patients had two-vessel and 10 patients had three-vessel disease. Values of hs-CRP are significantly higher in patients with positive ergometri. Ergometri doesn't effect on levels of hs-CRP.

Conclusions: Hs-CRP is independent predict of future cardiovascular events, who add prognostic informations on lipid screening and non-invasion metods. This finding point out that level of inflammation (mesured with hs-CRP) is much more dependent on pathoanatomy end on proces alteration in coronary artery while physical loading and induced myocardial ischemia are practicly without effects on hs-CRP level.

Keywords: High-sensitivity C-reactive protein, ergometri, myocardial ischemia

**PULMONARY FUNCTION IN PATIENTS WITH SPINAL CORD LESIONS
AFTER COMPLETING PRIMARY REHABILITATION AT URI SOČA**

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Aims: Persons with spinal cord lesions are at a greater risk for pulmonary complications. Degree of impairment of lung function depends on the level and completeness of lesion, age, gender and associated pulmonary diseases. The higher level of lesion decreases FVC (forced ventilatory capacity) and FEV1 (forced expiratory volume in 1 second). At the level of cervical and high thoracic spinal cord lesion predominates increased parasympathetic tone in the lungs due to interruption of sympathetic innervation, which leads to an increased tone of the smooth muscle in the small airways of a reduced diameter small airways. The purpose of the study is to confirm that higher level of injury decreases FVC as well as Tiffeneau index (TI), as an indication of obstruction.

Methods: The study included 55 patients with spinal cord lesions after completing primary rehabilitation at URI Soča. We divided patients into 3 groups according to the level of lesion. In the group of cervical spinal cord lesion is 20 patients, of which male-dominated (15), in the group of high thoracic lesion (TH6-TH1) were men only. The overall low thoracic and lumbar lesion 26 subjects were also dominated by men (22). After the standard procedure, and calibration, we performed spirometry (Viasys Healthcare). We measured FVC (forced ventilatory capacity), FEV1 (Forced expiratory volume in 1 second), and calculate the TI, according to the NHANES II standards.

Results: When analyzing the obtained values of FVC, we found that among patients with cervical lesion compared to lower levels of lesion are statistically significant differences (p-value = 0.032). In analyzing the value of TI is not statistically significant.

Conclusion: FVC decreases with higher lever injury. Spirometry is less sensitive method to monitor airway obstruction in subjects with spinal cord lesion above the level of TH6.

Key words: spinal cord lesion, spirometry FVC, TI, obstruction

FIBROMYALGIA - THERAPEUTIC ASPECTS

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Introduction: Fibromyalgia (FM) is a chronic pain condition with spontaneous chronic widespread musculoskeletal pain and tenderness accompanied by a number of nonspecific symptoms (fatigue, sleep disturbance, cognitive changes, mood disturbance, and other variable somatic symptoms), with unknown etiology and which affects up to 5% of the general population worldwide. Low prevalence of FM is considered an underestimation and results from an insufficient knowledge about FM. Furthermore, pathophysiological mechanisms of FM are difficult to identify and current drug therapies demonstrate limited effectiveness, only focused to the management of single symptoms.

Diagnostic criteria: The new ACR criteria (2010) introduced the *symptom severity (SS) scale score*, which is a summary score from scales measuring the extent of fatigue, unrefreshed sleep, cognitive problems, and multiplicity of symptoms (such as headache, weakness, bowel problems, nausea, dizziness, numbness/tingling, hair loss) and the *widespread pain index (WPI)*. The new criteria obligate you to pay careful attention to the patient if you want to diagnose fibromyalgia.

Treatment: According to multiple pathophysiological mechanisms, the treatment involves multidisciplinary and multimodal approach, including a combination of pharmacological and nonpharmacological interventions based on recommendations: the American Pain Society (APS-2005), the European League Against Rheumatism (EULAR) (2007), the Association of the Scientific Medical Societies in Germany (AWMF) (2008), and Canadian Rheumatology Association (CRA) (2012). Pharmacological treatment (antidepressants, anticonvulsants and conventional analgesics) is directed toward pain and other symptoms control, but nonpharmacological management (aerobic exercise, strength training and cognitive behavioral therapy) is directed to functional consequences of the symptoms. CBT even for a short time is useful and can help reduce fear of pain and fear of activity. Patients should be encouraged to identify specific goals regarding health status and quality of life at the initiation of treatment, with reevaluation of goals during the follow-up. Although the treatment rarely relieves the symptoms completely, active role of educated FM patient and supportive surrounding are secondary necessary to provide beneficial clinical effects on this complex painful condition.

Key words: Fibromyalgia syndrome; Systematic review; Evidence - based guidelines, treatment

THE EFFECT OF LOW-LEVEL LASER THERAPY ON HAND FUNCTION AND QUALITY OF LIFE IN CARPAL TUNNEL SYNDROME

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Introduction: Low - level laser therapy (LLLT) has been found to have positive effects in the treatment of various musculoskeletal conditions. We aimed to evaluate the effects of LLLT used for idiopathic carpal tunnel syndrome (CTS) on the clinical and electrophysiological parameters and health-related quality of life in this study.

Materials and methods: A total of 49 hands of 26 female patients (mean age 54.65 ± 09.06 years) with symptoms of paresthesia and pain in their hands in whom the diagnosis of CTS was verified with electroneuromyographic examination were included in the study. All patients received 12 sessions of LLLT for 4 weeks (670 nm, continuous, 10 mW, 0.5 J/per point). The treatment was applied to 8 points on the skin overlying the transverse carpal ligament. Clinical assessments were performed at baseline, at the end of the treatment and at three months during follow-up. The presence of day and night paresthesia and pain in the last 2 weeks was queried and patients were evaluated with clinical variables such as Tinel's, Phalen's and reverse Phalen's test, sensory testing with monofilaments, abductor pollicis brevis (APB) muscle strength, handgrip test and pinch meter measurement, symptom severity score (SSS), functional status score (FSS) and the Short Form-36. In addition electrophysiologic studies were performed twice, just before and 3 months after the treatment.

Results: A significant improvement was seen at the end of the treatment regarding day and night paresthesia, pain, the Tinel's, Phalen's and reverse Phalen's test results, in FSS and SSS scores, the palmar, fingertip and lateral grip and APB muscle strength ($p < 0.05$). Moreover palmar grip, fingertip grip and FDS score significantly increased in the third month follow-up ($p < 0.05$). No significant increase was observed in hand grip strength and monofilament test results after treatment compared to before treatment but a statistically significant increase was observed in the third-month follow-up ($p < 0.05$). While scores for the physical function, pain, mental health status and energy level subscales of the quality of life increased after treatment ($p < 0.05$), the energy level also showed an increase in the third month follow-up ($p < 0.05$). Physical role difficulty and social function values were similar before and after treatment but had significantly increased by the third-month follow-up ($p < 0.05$). When the pre-treatment and third month post-treatment electrophysiological parameters were compared, median nerve motor distal latency, 3rd digit antidromic distal sensory latency, median sensorial nerve velocity at 3rd digit-wrist segment, median sensorial nerve action potential amplitude at palm-wrist segment measures statistically significant improvements were found ($p < 0.05$).

Conclusions: At the end of the three-month follow-up, we believe that LLLT may be a good conservative treatment method in the treatment of patients with CTS due to the improvement in clinical and electrophysiological parameters and quality of life we observed. However, randomized, controlled and large-scale studies are required to support our results.

Key words: Carpal tunnel syndrome, low-level laser therapy, electroneuromyography

ISOMETRIC DYNAMOMETRIC MEASUREMENTS OF MUSCLE FORCE AND SPECIFIC EXERCISES AGAINST LOW BACK PAIN

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Introduction: 500 patients with different musculoskeletal problems were measured with the dynamometer in the Health Centre Maribor, Slovenia. Among these, 136 patients with chronic low back pain (Clbp) were examined.

Materials and methods: To ascertain the differences between the forces of the specific muscle groups, strength tests were applied to trunk and hip flexors, trunk and hip extensors, trunk rotators (left and right) and hip abductors using dynamometer Eval Express (J TECH Medical, Utah, ZDA). Each patient was measured before and after the kinesiotherapeutic programme (treatment). 114 patients had improved the muscle force of specific muscles with specific, targeted exercises. 22 patients were directed to other specialists.

Results: After the first measurements, it was ascertained that 78 patients had weak trunk rotators, hip flexors, abductors and extensors, 24 patients had weak trunk extensors and 12 patients had weak trunk flexors. On the basis of the muscle force measurements, the individual kinesiotherapeutic programme was established.

Conclusions: The results show that kinesiotherapeutic treatment was successful. It shortened the rehabilitation time and patients' pain.

Key words: low back pain, specific exercises, isometric dynamometric measurements

ASSOCIATION OF VITAMIN D AND THE RISK OF FALLS IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Introduction: Vitamin D deficiency is widespread and has been associated with many chronic diseases, including osteoporosis. Besides its well-known functions in bone homeostasis (Bikle, 2007), it plays a role in the falls prevention (Bischoff-Ferrari, 2011).

Objective: This study was undertaken to explore the impact of vitamin D deficiency on a reduction in risk of falls at postmenopausal women with diagnosed osteoporosis (OP).

Method: In the prospective study we examined the status of vitamin D at postmenopausal women with OP, referred to our Institute from Jan 2012 till June 2012. Exclusion criteria were diseases and disorders which effects the risk of falls. Collected data included gender, age and self-reported duration of menopause. BMD was measured at lumbar spine, left and right femoral neck and total hip (DXA, Lunar Prodigy Advance). Vitamin D (25-OH) levels were measured from serum samples by an electrochemiluminescent immunoassay analysis (ECLIA, Cobas e 411), according to the manufacturer's instructions. Vitamin D deficiency was defined as ≤ 50 nmol/L and insufficiency as ≤ 75 nmol/L. To predict the risk of falls, we analyzed: balance (Tandem Standing Test), walking speed (m/sec.), muscle strength, walking and muscle function (Timed Up & Go Test). Statistical analyses were performed using SPSS v.20.

Results: Out of 58 women with OP (mean age 65.57 ± 7.18 ; age range 54 to 82 years) evaluation revealed vitamin D insufficiency at 21 (36.2%) and deficiency at 26 (44.8%) of participants. Mean concentration of vitamin D (25-OH) in whole sample was 55.36 ± 20.01 nmol/L (16.20 to 95.03 nmol/L). The prevalence of vitamin D deficiency was significantly higher compared to normal concentrations ($p < 0.01$). The high risk of falls according to balance test was determined at 15 (25.8%), walking speed at 45 (77.5%), muscle strength at 37 (63.7%) and walking and muscle function at 38 (65.5%) of participants. These tests showed statistically high risk of falls in participants with vitamin D deficiency ($p < 0.01$).

Conclusion: Our study showed a high prevalence of vitamin D deficiency at postmenopausal women with osteoporosis. Decrease of vitamin D concentration was associated with increased risk of falling. The results suggest that, although the menopause and vitamin D levels are correlated ($p < 0.01$), both are good independent predictors of risk of falls.

Key words: vitamin D, risk of falls, postmenopausal osteoporosis

COMBINED APPLICATION OF INTRA-ARTICULAR HYALURONATE INJECTIONS AND LASER THERAPY IN GONARTHROSIS TREATMENT

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Introduction: Arthrosis of the knee is one of the most common chronic degenerative rheumatic diseases. In addition to medical therapy (NSAIL, analgesics) treatment includes also hondroprotectors (orally or intraarticular use) and physical therapy (electrotherapy, laser therapy). **Object:** To compare the effects of laser therapy applied after application of intra - articular hyaluronate injections and laser therapy on pain points in order to reduce pain and increase range of motion in patient with gonarthrosis.

Materials and methods: 22 patients (14 women and 8 man) age of (60 to 74) are included and prospectively followed during gonarthrosis treatment at Institute of Rheumatology, Belgrade in the period 2009 - 2011. Diagnosis is made on ACR criteria (4 - 14 years ago). Pain is measured by VAS scale (Visual analog scale, 1-100 mm) before and after therapy. Ankle movement is measured with ankle arthromeres in degrees before and after competition of therapy. Patients are randomly assigned in two groups: First group with 12 patients, 8 women and 4 man, age (60 - 72 years), average $67,3 \pm 4,38$ and second group with 10 patients (6 woman and 4 men) age 64 to 76 years, average $67,8 \pm 4,04$. The disease is in the first group lasted 6 - 14 years, average of 9.83 ± 2.48 , and in-group II lasted 4-12 years, average 7.20 ± 2.52 . Both groups are comparable in age, gender distribution and gonarthrosis duration. Laser used in this study was Mediclaser 637 Electronic design, valve length of 780 Nm, and power of 70 mW. Patients in the first group received 3 injections of sodium hyaluronate, the preparation of hyaluronic acid (high concentration of 30 mg / 2 ml and the high molecular weight of 0.6 million Daltons by one to seven days to one knee under ultrasound control. After the last injection laser therapy started after five days. Patient in the second group were treated by laser on painful spots in both groups with LPL fr 2500 Hz, 60 sec., volume 70 MW and 2.1 J/cm² dose of X 3x weekly therapy in 10 consecutive doses. Evaluation of treatment in both groups were performed before and after the end of treatment and statistically analyzed in Windows SPSS 16 program

Results: 1. Analyzing the VAS scale data we found in group I significant decrease in pain before ($81,66 \pm 8,34$) and after therapy ($26,66 \pm 7,78$). In group II, significant decrease in pain before ($86,0 \pm 5,16$) and after therapy ($41.0 \pm 8,75$). It estimated high statistical significance in both groups, Kruskal Wallis test, $p < 0,001$.

2. In measuring ankle movement amplitude, mean flexion angle before therapy for the first group was $80,83 \pm 10,83$ and $126,6 \pm 11,54$ after treatment. In a second group the amplitude was $88,0 \pm 9,18$ before therapy and $112,0 \pm 9,18$ after treatment. High statistical significance is achieved also in improvement of ankle flexion amplitude in both groups (Kruskal Wallis test, $p < 0,001$).

3. Statistically significant reduction in pain and increased mobility achieved in group I (Mann – Whitney $p < 0,05$).

Conclusions: The analysis showed that laser therapy after intra-articular injection of hyaluronate and laser therapy on pain spots have high efficacy in reducing pain and increasing mobility of the knee joint in patients with gonartrosis, but the application of the laser after administration of intra-articular injection of hyaluronate has showed better efficiency.

Key words: Goanrthrosis, intra-articular hyaluronate injections, laser-therapy

IMPORTANCE OF USING SCREENING TOOLS TO IDENTIFY NEUROPATHIC PAIN

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Introduction: Neuropathic pain (NP) is caused by damage or dysfunction of the peripheral and/or central nervous system, rather than stimulation of pain receptors. It can involve any level of the nervous system. Pain is subjective phenomenon and it makes sense to examine verbal descriptions when we diagnose pain type. Recognition of the NP, finding difficult 66 % of general practitioners, 50 % of rheumatologists and 33 % of neurologists.

Aim of this study was to review the literature regarding the most recommending screening tools for assessment of NP.

Materials and methods: Electronic databases were searched for guidelines in the last three years, using a combination of terms such as NP, guidelines and assessment. Criteria for choosing the tools were: sensitivity, specificity and time needed to finish the evaluation with recommended tools for NP.

Results: We found that the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS), the Douleur Neuropathique en 4 questions (DN4), PainDETECT and the Neuropathic Pain Questionnaire (NPQ) are the most common recommended screening tools for NP. LANSS had sensitivity, range 82 – 91 %, and specificity range 80 – 94 %. The DN4 showed 83 % sensitivity and 90% specificity. PainDETECT showed 85 % sensitivity and 80 % specificity. The NPQ demonstrated 66 % sensitivity and 74 % specificity. LANSS and DN4 had the lowest number of items and they required the shortest time to finish the screening.

Conclusions: LANSS and DN4 are the easiest used specific tools for NP. They have the greatest sensitivity and specificity among the recommended screening tools according the guidelines for NP which are published in the last three years. They include both, the interview and clinical examination. With recommended screening tools it is able to identify the potential patients with NP, particularly by non-specialists. But in 10 - 20 % of patients with clinically diagnosed NP, these tools fail to identify NP. Validation of these screening tools in Serbian language is obligatory.

Key words: neuropathic pain, assessment, guidelines

ULTRASOUND ASSESSMENT OF LUMBAR MULTIFIDUS AND TRANSVERSUS ABDOMINIS MUSCLE IN LBP AND NON LBP SUBJECTS

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Introduction: Transversus abdominis and lumbar multifidus muscle have been proposed to play key role in stability of the lumbosacral spine. The muscles' functional and/or structural deficits have been linked to the low back pain (LBP) syndrome. Evaluation of the transversus abdominis and lumbar multifidus muscle in clinical practice is scarce and not well defined due to number of reasons. Our aim was to investigate the potential of ultrasound imaging in assessing these muscles.

Materials and methods: 98 participants were recruited for this cross sectional study: 56 subjects with LBP and 42 non LBP subjects. Demographic and past medical history data were acquired. Level of pain was assessed by 11-point Numeric Pain Rating Scale to assess pain intensity. Oswestry Low Back Pain Disability Questionnaire was administered to assess self-reported disability in everyday life. Ultrasound imaging was conducted using Toshiba Diagnostic Ultrasound System (Nemio SSA-550°, 3.75 MHz curvilinear probe. The images were acquired in B – mode. The thickness of the muscles at rest and during activation was assessed by the rater, who was blinded to the group assignment. TrA and LM muscle thickness was measured bilaterally using the on-screen calipers, once a day on the three consecutive days.

Results: Age, body mass index, and distribution by gender were not significantly different between LBP and healthy subjects. The LBP subjects reported on average moderate levels of pain lasting nearly 3 months prior to enrollment and causing moderate levels of disability. Healthy males had significantly thicker TrA at rest and contraction, than healthy females ($p < 0,000$). No significant difference in relative thickness change was found across gender in healthy subjects ($p > 0,000$). The thickness of LM was not significantly different between healthy males and females at rest ($p = 0,517$), contraction ($p = 0,726$) nor in relative thickness change ($p = 0,125$). The relative change of TrA thickness during activation was statistically significant between LBP and non LBP subjects ($p < 0,000$). The relative increase of LM thickness was also significantly higher in healthy subjects ($p < 0,000$).

Conclusions: Healthy males have significantly thicker TrA at rest and activation than females. There is no statistically significant difference between healthy males and females in LM thickness at rest and activation. The relative change of muscle thickness for TrA and LM did not differ across gender in healthy subjects. The relative change of the muscle thickness for both TrA and LM at rest and activation was statistically higher in healthy subject than in participants with LBP.

Key words: low back pain, lumbar multifidus muscle, transversus abdominis muscle, ultrasound

EPIDEMIOLOGY OF NEUROPATHIC PAIN - IMPORTANT LINK TO THERAPEUTIC STRATEGY

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Introduction Neuropathic pain is defined as pain arising as a direct consequence of a lesion or a disease affecting the somatosensory system. All neuropathic pains are associated with poor general health, comparable with other severe chronic diseases. Although neuropathic pain can be acute in nature, in most patients the pain is persistent (or “refractory”). Chronic neuropathic pain is a common presentation in clinical practice, it greatly impairs the quality of life, and poses a major economic burden to society. Aim of this study was to review the literature regarding distribution, prevalence and incidence of neuropathic pain. A diagnosis of neuropathic pain and its cause may be delayed or missed because neuropathy generally develops very gradually and people with the condition may be unaware of it. Neuropathic pain is a symptom of many different conditions, so a thorough medical evaluation is needed to ensure an accurate diagnosis of the reason for neuropathic pain.

Materials and methods Electronic database PubMed were searched for articles which were dealing with distribution, prevalence and incidence of neuropathic pain.

Results The prevalence of pain predominantly of neuropathic origin has been reported as 7–8% in French and UK surveys, and is more intense in comparison with chronic pain without neuropathic characteristics. Neuropathic pain is a rather frequent condition with an annual incidence of almost 1% of the general population and women are more often affected. A higher prevalence of chronic pain with neuropathic characteristics was associated with middle age (50–64 years), manual professions and those living in rural areas. It was more frequently located in the lower limbs and its intensity and duration were higher in comparison with chronic pain without neuropathic characteristics. The main causes of neuropathic pain vary geographically. In developing countries, infectious diseases such as human immunodeficiency virus (HIV) infection and leprosy, trauma (e.g., due to war wounds and amputations) and radiculopathies related to spinal column diseases are among the most common causes of neuropathic pain. Regarding phantom limb pain, it may occur during the first year after amputation in 53% to 85% of patients. In developed countries, the most frequent causes of neuropathic pain are diabetic polyneuropathy and radiculopathies with neuropathic pain components. The best estimate of overall prevalence of painful diabetic peripheral neuropathy in the diabetic population is 15%. The prevalence of central pain in Multiple Sclerosis was 22.6%.

Conclusions: The true incidence of neuropathic pain in different health conditions is under-diagnosed. The observed distribution rates often differs between geographic setting, time period evaluated, source of data, and diagnostic or disease definitions. The nature and epidemiology of pain and especially neuropathic pain is very important link to complete therapeutic strategy and avoid misdiagnoses and to choose right therapeutic direction.

Key words: Neuropathic pain, incidence, prevalence, epidemiology, therapeutic strategy

IMPORTANCE OF CLINICAL DIAGNOSIS ON A QUALITY OF LIFE OF PATIENT SICK OF ASTHMA

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"Asthma is a chronic inflammation of respiratory functions in which many cells including mastocyte, eosinophile i T-lumphocyte."

There are three symptoms which are characteristic for Asthma: wheezing; dispnea; cough

The aim of this work is to perceive influence of dispnea with wheezing in breath; miken and also to the influence of obstruction in respiratory function by auscultaty diagnosis.

METHOD AND RESULTS: Stadying is divided into three groups: toward the symptoms of dispnea with the wheezing I group (47) - without dispnea but with wheezing; II group (15) - dispnea with wheezing under the effort; III group (38) dispnea with wheezing without the effort. And toward the presence of pathologic noise there are four groups:

I group (18 patients) no pathologic noise; II group (41) high wheezing III group (64) low wheezing; IV (35) polyphon wheezing.

Toward level of obstruction and quality of life, patients are divided in three groups:

I group : (22 patients) < 60% ; II group : (31 patient) od 60 do 80 %; III group : (47 patient) > 80%

Detail anamnesis clinical diagnosis and stady of pulmatory function is taken from all patient. At the same time questioneery of the quality - of life was a applied (AQLQ). Like we could expect the wheezing had in the district of symptoms ($P < 0,0005$). There was very high statistic difference betuine among oll scores of AQLQ of questionnaire, except the influence of outhr factors. Presence of pathologic noise in lungs tall influences on a district of limitation of activity of symphptoms, emotional condition symptoms and on a total score of QOL of the patient.

All questionnaire scores had the highest values with patients with normal auscultatory diagnosis (I group and lowest with patient who had polyphon wheezing (IV group).

Presence of pathologic noise had the highest influence on a district of symptom of disease ($p < 0,0005$).

In a conclusion we can say that symptoms of asthma and obstruction in respiratory functions analysing by auscultatory diagnosis had a big influence on a QOL. Numerous clinical stodying petrified the correlation between subjectively peception of health condition of the patients and objectivelu diagnosis.

DIABETES MELLITUS AND LIMB AMPUTATION

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Diabetes mellitus is a chronic condition characterized by disorder in metabolic balance of glycemia, lipids and proteins. This condition is followed by general disfunctioning and decreased functioning of various organs (eyes, kidneys, nerves, heart and blood vessels). The prevalence of this condition is 2,5% in our country. Due to its aggressive progression and disorders on micro- and macrocirculation level, ie. the impairments on arterial wall membranes, it is likely to expect an amputation of an impaired limb up to 90% as a final outcome.

When neither a conservative treatment nor reconstructive surgery lead to recovery, an amputation becomes inevitable.

The most common is a partial foot amputation, then below-limb and above-knee amputation. Four percent of unilateral amputations become bilateral in 12 months time.

Specific characteristics of prosthetic rehabilitation are present in all phases of rehabilitation and require a specialized team approach.

The Special Hospital for Prosthetics and Rehabilitation, conducted a retrospective study of the period from 1.1.2013. to 30.6.2013.god, during which treated 252 patients, of whom 137 suffered from the DM, 97 men and women were 38. Svi patients with complications of DM.

Prolonged wound healing with increased risk of complications may slow down the rehabilitation process. It is necessary that skin of the residual limb be frequently inspected to enable successful prosthetic fitting. The choice of materials and prosthetic components during prosthetic prescription is a crucial condition for the efficient rehabilitation. The treatment is organized according to the patient's general condition, skin quality and integrity, vascular status of the valid limb, neurological status and present diabetic complications. Frequent instability of metabolic disorders (hyper and hypoglycemia), obesity, muscular weakness, joint conditions, sight impairments, increased consumption of oxygen while working out, cognitive disabilities, sensibility disturbances, frequent infections present the parameters taken into consideration for prosthetic rehabilitation and make it more complex. Numerous methods of physical and kinesitherapeutical procedures are used within regular program of prosthetic rehabilitation for the purpose of rehabilitation. After prosthetic fitting, prosthetic training requires well-controlled gradual loading of all functional segments. Functional capability is lowered in comparison to the other causes of amputation. Prosthetic use is time-limited. The stated facts lessen the quality of life of patients. With the aim of preventing further medical complications patients are advised to be on a specific hygienic-dietetic regime with the adequate medicament therapy, regular check-ups and monitoring comorbidities.

Key words: diabetes mellitus, amputation, prosthetic rehabilitation

STATE OF THE ART OF TRANSFEMORAL SOCKETS IN COLOMBIA

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Introduction: In Colombia, most of the amputees have difficult access to rehabilitation services because they live on the countryside and have low incomes. The quality of life of transfemoral amputees depends mainly on the level of comfort brought by the socket because this is the element that has direct contact with the residual limb. Sockets are custom made elements of transfemoral prosthesis that work as the interphase between the residual limb and the prosthesis. Due to this fact, that component requires the presence of the amputee for its fabrication; therefore, they can only be developed by the local rehabilitation centers.

Materials and methods: Interviews to the main Colombian sockets manufactures or physiatrists were made in order to establish the characteristics of the sockets developed by Colombian prosthetic workshops. The main focus of the interviews was the material and manufacturing process use to the fabrication of the sockets. The targeted workshops are located in main Colombian cities like Bogota, Medellin, Cali, and Bucaramanga.

Results: The rehabilitation centers are located in the main cities of the country where they manufacture, basically, thermoformed sockets with materials like polypropylene. The typical fabrication process in Colombia starts with a negative cast from the residual limb, which is used afterwards to create the positive cast where the polymer is thermoformed. The polymer is not thermoformed following the exact shape of the residual limb, but has some differences in order to apply or relief pressure according to the limb shape.

Conclusions: The socket manufacturing process depends primarily on the expertise of the prosthetic technician. Additionally, there have been no big improvements on this field in the last decade in Colombia as well as in other developing countries. In this article the state of the art of transfemoral sockets in Colombia is established as a first step on the developing of a new design that can improve the quality of life of Colombian amputees.

Key words: transfemoral amputee, socket, quality of life

REHABILITATION OF POLYTRAUMATIZED CHILDREN WITH AMPUTATIONS

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Introduction: The most common cause of acquired amputations in children is trauma during play or a malignant disease after the age of five. Polytrauma leads to multiple-site damage and a serious decrease of function. Complex hospital rehabilitation in phases is necessary when the trauma causes limb amputation and fractures of other parts of head, body and limbs.

Materials and methods: The review of general and prosthetic rehabilitation delivered to two children with polytrauma and limb amputation hospitalized in Specialized Hospital for Rehabilitation and Orthopedic Prosthetics in 2012. After the surgical treatment, the children underwent kinesiotherapy, physical and occupational therapy, prosthetic fitting and a simultaneous psychotherapy and functional education, in the presence of their parents, achieving the optimal independence and functionality. Parameters of general and specific functions were followed (Wee FIM, TM, TV, Stump characteristics, Narang, ROM, MMT, interview...) through all the phases of rehabilitation.

Results: A girl, V.C., aged 12, injured by an agricultural device while playing: the jaw and facial fractures, fractures of above-knee and below-knee bones of left leg, transfemoral amputation of the right leg, multiple lacerations and contusions of body parts, surgery and skin graft scars healing by secondary intention. Dependent in all activities being performed in bed, with an external thigh fixator, intimidated, in a crying mood. All the fractures were stabilized, an above-knee endoskeletal prosthesis was fitted and the patient achieved complete independence in most daily activities including overcoming obstacles. Continued her education with good grades, hopeful, cheerful, likes table-tennis and geography, draws well.

A boy, N.J., aged 12, injured by high-voltage electricity while playing with ball: shoulder disarticulation of the right arm, proximal transtibial amputation of the left leg and numerous scars of burns and skin-grafting for covering defects, intimidated, sad. At the beginning of rehabilitation process, the patient was dependent in all daily activities, having wounds in the final phase of epithelialisation and hip and knee contractures of the left leg. All the wounds were treated, full motion achieved, as well as the power of all the body segments, fitted with a cosmetic prosthesis for the right arm and a below-knee endoskeletal functional prosthesis. Achieved a total independence in all daily activities, continued school, plays football, rides a bicycle.

Conclusion: Both children were successfully rehabilitated for independent performance of everyday activities and prosthetic patient and family members education done by all team members gave good results. Follow-up will further show the quality of life and further development of the reckless children.

Key words: Polytrauma, amputation, prosthetic rehabilitation, children

PSYCHOLOGICAL ASPECTS OF CHRONIC PAIN PATIENTS

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Introduction: Psychological factors may play an important role in the onset, severity, exacerbation, or maintenance of chronic pain in rheumatic diseases.

The aim of the study: Analysis of psychosomatic aspects in patients with low back pain (LBP) and rheumatoid arthritis patients (RA).

Material and methods: We examined 120 patients (60 LBP; mean age 48.92 ± 10.42 yrs, and 60 RA mean age 53.92 ± 7.06 yrs). The patients were multidisciplinary examined and treated at Clinic for Medical Rehabilitation, Clinical Center of Novi Sad and at Special Hospital for rheumatic diseases in Novi Sad with standard physical procedures during 4.2 ± 0.5 weeks. We evaluated the pain (Visual analogue scale (VAS), the functional status (Oswestry Disability Questionnaire-ODQ), and HAQ (Health assessment Questionnaire), the psychological profile (Minnesota Multiphasic Personal Inventory- MMPI).

Results: showed the pathological profile in 41 % LBP patients (hypochondria in 16,67%, hysteria in 13,33% patients and depression in 5% patients), and in the 48,33% RA patients (depression in 20 % of patients, hypochondria in 20 %, conversion in 5%). Pain measured by VAS were severe in the both group of patients (LBP, RA) with pathological profile ($p < 0.05$). The intensity of pain was assessed by visual analogue scale was significantly associated with functional status ($p < 0.01$); Both groups with pathological profile showed statistically significant functional limitation than patients with adaptive forms of behavior ($p < 0.05$).

Conclusion: Psychogenic factor often complicate treatment, so the team approach during rehabilitation treatment chronic pain patients is necessary.

Key words: low back pain, rheumatoid arthritis, psychopathology, MMPI

**PRESENCE OF CERVICAL AND LUMBAR PAIN SYNDROMES AMONG WORKERS AT
REGULAR PHYSICAL EXAMINATION**

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Introduction: Cervical and lumbar syndrome are the most common pain syndromes in physical medicine. Both occur in the area of degeneratively changed cervical and lumbar spine with the existing irritation of neurovascular structures. The most common clinical signs and symptoms are the pain and loss of function. Those affect the most productive segment of society and lead to frequent absences from work.

Objective: Physical examinations of the fittest working population are aimed at the prevention, diagnosis and treatment in a timely manner closer to this target group. In this way, physical therapist working with these patients has significant impacts on the socio-economic sphere of society. Special attention is given to present CS and LS as the most common health problems of patients.

Method of work and material: Physical examination included 666 employees of one company in Nis in the period from 22. 10. 2012. to 31. 01. 2013. Physicians in DZ Nis, on the basis of good anamnesis and physical examination, diagnosed health problems with 443 (66.52%) men and 223 (33.48%) women. The men were aged between 30 - 65 and women from 30 - 61.

Results: Of the total number of respondents, the results were normal in 274 (41.14%) of the respondents, ie. at 204 (74.45%) men and 70 (25.55%) women. CS was present in 115 (17.27%) percent of the respondents, LS, 172 (25.83%). Of that number, nearly 55 CS (47.83%) males and 60 (52.17%) women. LS was present in 124 (72.09%) men and in 48 (27.91%) women. Both diagnoses (CS and LS) were present in 19 (63.33%) males and 11 (36.67%) females. At the aggregate level, both diagnoses were present in 30 patients which is 4.50%. Other diagnoses were present in 75 patients out of the total number of which is 11.26% and in 46 (61.33%) males and 29 (38.67%) females.

Conclusion: Painful CS and LS are syndromes which are usually present with the working population. Physical examinations and testing showed that the total number of respondents where the painful LS was present were male, while women suffered from CS. Physicians with proper diagnose and physical therapy play a leading role in addressing these painful conditions. Prevention through discussion and advising the proper way of life and work are indispensable. All the patients were given advice for further examination and implementation of physical therapy.

Keywords: CS, LS, physical examination, physical therapy

CAUTION IN PRESCRIBING PHYSICAL THERAPY

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Introduction: Spondylodiscitis is a localized inflammation of the intervertebral space and the body of vertebra. Two forms are distinguished: primary and secondary. The secondary spondylodiscitis occurs following a surgery for disc herniation, and the literature has described only a small percentage, i.e. 2-3% of all patients who underwent operation.

Materials and methods: The paper presents a case of C.P., 58 years old, who was sent to our hospital having undergone an operative treatment for the prolapsed i.v. disc L4L5 on two occasions. The first operation was in September 2012 after which the physical therapy started which was stopped because of pain, and the second in January 2013, for recurrence of the prolapse. At the first examination in our hospital and after the second surgery with a detailed anamnesis, medical examination, routine laboratory analyses, control RTG, because of the two operations within a relatively short period and the persistent pain syndrome, NMR of the LS spine was proposed and done, which clearly pointed out to the changes in terms of spondylodiscitis L4L5.

Results: For this patient, of course, the rehabilitation treatment was not initiated, and he was referred to an infectious disease clinic despite the *normal standard laboratory analyses*, and after a specific diagnosis: CRP electrophoresis which was substantially higher, as well as other findings described in the paper, consulting a neurologist, a neurosurgeon, and absolute team evaluation, he was referred to a regional hospital for further adequate antibiotic therapy, and according to the treatment protocol, to further diagnostic methods and mode of life. The clinical picture is frequently atypical / followed by the expected findings in laboratory analyses, febrility and other common side effects /.

Conclusions: This case advises for caution in examination, equal importance of detailed anamnesis, diagnostic parameters, and discrete subjective complaints, despite the clinical picture which does not have to be typical, and the great importance of good evaluation, i.e. decision on the type of treatment and the method to implement it.

Key words: Anamnesis, evaluation, additional diagnostics

**REHABILITATION AFTER ARTHROSCOPIC ANTERIOR SHOULDER STABILIZATION –
EARLY EXPERIENCE**

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Introduction: Arthroscopic stabilization of shoulder, being the leading method in treatment of anterior shoulder instability, was introduced in our Institution in the end of 2010. A good outcome of treatment of patients with shoulder instability depends on the good result of operative treatment as well as on timely initiated and well organized rehabilitation.

The aim of the study is to show initial results in rehabilitation of patients after arthroscopic anterior shoulder stabilization.

Patients and methods: By prospective research, we monitored 23 patients after arthroscopic stabilization of anterior shoulder instability within the period from September 2010 to December 2012. Rehabilitation of all patients started on the first postoperative day and was implemented according to valid protocol through 4 stages of total duration of 6 months. Parameters of monitoring were VAS pain scale, range of motion in shoulder joint, Rowe score, Constant Shoulder Score and Oxford Shoulder Score. The results /preoperatively and 6 months postoperative/ were analyzed using Student's t test.

Results: In 17 patients, the outcome of rehabilitation was very good (73,91%), good result was achieved in 4 patients (17,39%), while 2 patient had satisfactory result (8,7%). There were significant differences in all of the parameters of evaluation ($p < 0,05$) except in the range of motion.

Conclusion: Initial experiences encourage and show necessity of rehabilitation after arthroscopic anterior shoulder stabilization which must be initiated in time and implemented professionally by multidisciplinary team approach. There is a need of constant evaluation and as needed the modification of elements of protocol of rehabilitation by the operator and rehabilitation team.

Key words: rehabilitation, anterior shoulder instability, arthroscopic stabilization

MAJOR TRAUMA REHABILITATION

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Introduction: The Walton Centre NHS Foundation Trust (WCFT) along with Aintree University Hospital and Royal Liverpool Hospitals, Liverpool, United Kingdom became the major trauma centre collaborative (MTCC) for the Cheshire and Merseyside region covering population of 2.4 million population from the 11th June 2012. The MTCC aims to provide 24 hour specialist treatment for the most seriously injured (major trauma) patients. The Walton centre being specialist Neuroscience centre, patients with major trauma and neurotrauma are admitted for neurosurgical and rehabilitation care. The commissions included the rehabilitation prescription as the criteria to achieve best care for major trauma patients. An early and individualised, rehabilitation prescription was implemented to outline the rehabilitation needs required by each patient to help maximise their recovery. For each trauma patient we aim to complete a rehabilitation prescription within 48 hours of admission to the hospital.

Materials and methods: We reviewed patients admitted to The Walton centre, with major trauma over last 6 months (October 2012 to March 2013). We looked in to number of patients admitted each month, injury severity score, demographic data, cause of major trauma, average length of stay in hospital and their outcome

Results: Walton Centre received 150 major trauma admissions over these 6 months. 74% of major trauma patients were males. Significant majority (81.3%) had very severe injuries with injury severity score (ISS) more than 15, while 14.6% had ISS of 9-15. Falls was accounted as the most common cause of major trauma (73%), while 16% had Road traffic accidents. In 99.3% of eligible cases we could successfully completed rehabilitation prescription and passport within time. Average length of stay of these patients in our hospital was 15.5 days. 96.7% survived following such severe injury and had successful outcome.

Conclusions: Early findings suggestive of successful delivery of high quality rehabilitation care following Major trauma as per local and national guidelines. Earlier rehabilitation input following major trauma decrease length of stay in hospital and improves the outcome. Our study is ongoing, hoping to present full findings at the conference

Key words: Major Trauma Rehabilitation, Rehab prescription, Rehabilitation passport

TREATING A COMPLEX SHOULDER INJURY – CASE REPORT

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Introduction: Posterior shoulder luxation is a rare injury, hard to diagnose, but it can lead to severe consequences. We will present a case of a man, a dentist, who lost his right leg in a car accident, and due to an undiagnosed shoulder injury, he was subsequently given right shoulder prosthesis. **Materials and methods:** Patient G.I., age 33, was injured in a car accident as a motorcyclist on August 8th, 2011. The patient suffered a poly - trauma (Amputatio femoris lat. dex. traumatica, Fractura ulnae lat. dex. aperta, Luxatio art. Cubiti lat. sin., Contusio ommae lat. dex. St. post shock traumaticam). He was hospitalized in Sabac, where his wound on his shank was sutured and his left elbow was repositioned. Afterwards, he was transferred to Belgrade, to orthopaedics ward at the CCS (Clinical Center of Serbia) where an intervention was performed on his stump and the fracture on his right forearm was operated on. From October 10th until February 28th 2012, the patient was at the Specialized Hospital for Rehabilitation and Orthopaedic Prosthetics where he was given upper leg prosthesis for the right leg and where he tried to rehabilitate his right shoulder, while constantly feeling pains and having limited mobility of the right shoulder. In February 2012, in Banja Luka, he was diagnosed “an overlooked posterior luxation of the right shoulder with a defect in humerus head which is locked in glenoid”. He was suggested a surgical procedure, which was performed in Belgrade on July 1st, 2012. A partial prosthesis of the shoulder joint was placed. The pains were less prominent; however the mobility of the shoulder was still minimal. The patient returned to his birthplace, to Banja Koviljaca, on September 12th 2012, now as a patient with crushed dreams, with pain in his soul much stronger than the one in his body, with the right upper leg prosthesis and with endoprosthesis of the right shoulder. He did not even consider returning to work as a dentist.

Results: At the Specialized Rehabilitation Hospital Banja Koviljaca, a complex balneophysical treatment was conducted, with constant supervision of the CCS orthopaedic surgeons. After only a month of inpatient treatment, first results could be seen in the form of pain reduction and an increase in the mobility of the right shoulder. Afterwards, outpatient treatment is continued and after 6 months since the shoulder surgery, we have achieved outstanding results. Range of motion in the right shoulder significantly improved, the muscles have strengthened, pain syndrome is reduced, and the quality of life has improved according to the SF36 questionnaire. The walk improved and became adequately steady. But the most important result is the fact that the patient is motivated, he has a renewed faith in life, and he has returned to his profession. He hasn't reconciled with the opinion of the Disability committee. He still regularly does physical therapy and hydro kinesis.

Conclusions: With poly-traumatized patients, vital problems are dealt with first. Some conditions may even be overlooked. Although there are contemporary diagnostics nowadays, the patient and their opinions should never be neglected. Properly prescribed and timely commenced rehabilitation can considerably improve the recovery and affect the outcome of the treatment. Pictures speak a thousand words!

Key words: luxation, shoulder joint, balneotherapy, rehabilitation, endoprosthesis

**FORENSIC PHYSIATRIST AS AN EXPERT IN COMPLICATED INJURY OF THE ELBOW
JOINT IN A CAR ACCIDENT**

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Introduction: More traffic participants (drivers, co-drivers, pedestrians, passengers) experiences trauma with lasting consequences. Because of that the trials are more frequent and appointed experts of medical profession are more engaged. Forensic expertise can be accessed after the end of treatment and rehabilitation, so physiatrists as forensic experts are more significant. Municipal Court determined the forensic expertise in the case of AA against the defendant insurance company SS to assess the possible existence of reduction of working ability. The Decision is that forensic expert evaluation determines whether with the accuser AA there is reduced work ability at all, and if there is any in what percent it is.

Materials and methods: After a certain diagnostic procedures (Rtg, EMNG), physical examinations, access to court documents and medical records, protocols of treatment and rehabilitation the opinion was given.

Results: With the accuser AA current situation is practically definitely, improvement should not be expected, injury happened eight years ago (2001.).

Conclusions: Diminished work capacity of the accuser is 15%. It is reflected in the fact that the prosecutor AA is having certain interference during the exercise of the right hand, and will not be able to perform in a satisfactory manner, especially to be affected in the performance of physical work and precise jobs. The Court has fully adopted the conclusions.

Key words: Forensic expertise, the elbow joint injury, physiotherapist, assessment of working ability, the percentage reduction of working ability.

**REHABILITATION AFTER LEG LENGTHENING IN DYSCHONDROPLASTIC PATIENT: A
CASE REPORT**

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We report the case of a 26-year-old patient N. J. with congenital dyschondroplasia. The patient was referred to the Orthopedic Clinic, Clinical Center of Nis in July 2008, due to the lower limb pain, that worsened during prolonged standing and walking, particularly up and down the stairs. After clinical, radiological and NMR imaging, surgical crura elongation was proposed. After the preoperative preparation, on August 7th, 2009, right tibial and fibular osteotomy was performed with an external fixation. Operative and early postoperative course was uneventful, and the patient was trained for the distraction of the apparatus. Elongation of 1 to 1, 5 mm per day began, with the verticalisation and non-weight bearing walking with crutches. On the 9th of December 2009, the identical surgical intervention was performed on the left leg. Early postoperative course was smooth, but on the 4th of March 2010 correction of the left crus position with fibular corticotomy and external fixation had to be done. Since the first postoperative day, the patient was included in an early rehabilitation program, and on two occasions was hospitalized at the Clinic of Physical and Rehabilitation Medicine in Nis, during April and November of 2010, for a total of two months. During inpatient rehabilitation cryo, kinesi, occupational, lasero, electro and medicamentous therapies were applied successfully, as well as pulsed sinusoidal magnetic field, for cortical bone and marrow cavity restoration. The 83 mm crus elongation was achieved, and external fixators were removed eight months after the original application. After fixators' extraction, the outpatient's rehabilitation continued with additional hydro and hydro/kinesi therapies. Despite muscular hypotrophy of the lower extremities and the initially reduced range of motion in both knees and ankles, good aesthetic and functional results were obtained. After the second inpatient rehabilitation, the functional range of motion was achieved in both knees and the right ankle and after outpatient rehabilitation in the left ankle as well, with the enhanced muscular strength. Elongation of the lower limbs in dyschondroplastic patient reduced pain and improved trunk-to-lower - limb proportions. Early rehabilitation treatment was essential for satisfactory clinical results.

Key words: congenital dyschondroplasia, crus elongation, external fixator, rehabilitation

THE IMPORTANCE OF REGULAR REPETITION OF REHABILITATION TREATMENT FOR PATIENTS WITH ARTHRITIDES

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Introduction: Arthritides are chronic degenerative joint diseases accompanied by chronic pain, limited mobility and difficulty in performing daily activities. They present a significant socio-medical problem. The most commonly affected joints are the hip and knee (coxarthrosis and gonarthrosis), given that they endure the greatest stress.

Materials and methods: The paper presents the monitoring of 49 patients in the period of two years. Patients are uniform in all the necessary criteria, the initial VAS, MMT, HTA, DM, and other comorbidity factors.

Results: They were treated with standard procedures according to the protocol/kinesi, occupational, electric, laser, water or cryo, depending on the clinical picture and comorbidities/, and the outcome and length of treatment is controlled through VAS, MMT of the thigh region, as well as the length of rehabilitation. A number of patients is still in the process, but the monitoring so far has given the preliminary result that the average VAS is decreased by a higher percentage as well as in less time with patients who are on *regular* periodic repetitions. It is to be expected that after two years, with aging, the effect of physical therapy is less efficient and the therapeutic response becomes slower. However, the results indicate the opposite, confirming that the repetition of rehabilitation therapy in degenerative diseases is one of the most important requirements for the maintenance of functional status and a better quality of life. I would like to emphasize that the patients who were referred for rehabilitation therapy as preoperative preparation were excluded from the monitoring.

Conclusions: Faster and better effect is achieved in patients who come to periodical repetitions of physical therapy rather than with the first visit.

**OUTCOME MEASURES FOLLOWING SELF MANAGEMENT TO THE KNEE
OSTEOARTHRITIS**

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Background: Knee osteoarthritis (OA) is a painful condition causing disability and handicap. Treatment of knee OA consists of a combination of non-pharmacological and pharmacological approaches. Non-pharmacological approaches include orthoses, exercise, diet and patient education. Even if exercise therapy is a key treatment modality in OA, the optimal content of this treatment has yet to be precisely described.

Aim: The aim of this prospective study was to assess the effectiveness of a self-management program among osteoarthritis knee sufferers.

Methods: This study was carried out on patients having consulted in our rehabilitation department from September 2010 to December 2011 and included 146 patients aged more than 45 years. All subjects received advice and information for the practice of specific exercises at home. Exercise therapy was explained to patients to improve adherence to treatment. Patients were assessed before treatment, after treatment and at each 3 month follow-up. Outcome measures included visual analogue scale VAS pain on walking, VAS pain at rest, range of motion, Western Ontario and Master University Index WOMAC and LEQUESNE index.

Findings: The mean final outcome measurements were taken after 12month of follow-up. The average VAS score for pain at rest dropped from 68 ± 10 to 31 ± 30 . The score for pain during effort fell from 85 ± 13 to 40 ± 30 . In 82% of cases, joint mobility was better at the final assessment. There was a significant decrease of number of unplanned medical consultations. Functional scores were improved. 65% of patients were satisfied. However, functional improvement correlated well with adherence to exercise therapy.

Conclusion: Even when it is done at home unattended, unsupervised and without expensive equipment, self management program may be beneficial for pain and function.

THE EFFICACY OF MAGNETOTHERAPY IN KNEE OSTEOARTHRITIS

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Introduction: The efficacy of magnetotherapy (MT) in knee osteoarthritis (KOA) patients is still questioned. The aim was to compare the short-time efficacy of three-week MT in the randomised and placebo controlled trial in reducing pain, improving physical function and quality of life.

Material and methods: The trial was conducted in 2012 at the IPRM UCC Maribor, Slovenia. Inclusion criteria were clinical-radiologic criteria of American College of Rheumatology, and Kellgren and Lawrence grades I-III. Exclusion criteria were inflammatory rheumatic diseases, knee hydrops, deep venous thrombosis, symptomatic arthrosis of others lower extremity joints, lower back pain and radiculopathy, physiotherapy and intraarticular injections in the last six months. Fifty subjects were randomized in three groups: group A (N = 16; Magus Magnetotherapy, Status, Ljubljana, Slovenia; max. 30 G, 1-21 Hz), group B (N = 14; Quattro Pro, ASA, Italy; 85 G, 20 Hz), and group C (N = 20; fake Magus Magnetotherapy). MT lasted for three weeks (15 sessions for 30 minutes each). The evaluation was done three times: on inclusion (T₀), after the last session (T₁), and three months after (T₂). Primary rehabilitation outcomes were Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Short form 36 v. 2 (SF-36). In the statistical analysis the Wilcoxon Signed Rank Test and Kruskal Wallis Test were used. P value for individual parameter was set at 0,05, and in combination of WOMAC and SF-36 on 0,025.

Results: The mean age of 50 subjects (34 women and 16 men) was 64,3 ys (range 46 - 89 ys, SD 8,5 ys). The mean time of KOA symptoms' duration was 7,9 ys (range 0,4 - 25 ys, SD 6,1 ys). There were no basic statistically significant differences between the groups in subjects' mean age, symptoms duration time, body mass index, WOMAC, and SF-36. The best improvement of WOMAC score and PCS subscore of SF-36 was reached in group B (Quattro Pro MT). The only two statistically significant results in the group C (placebo) were reached in comparing WOMAC pain and stiffness subscores between T₀ and T₂. There were no statistically significant differences in WOMAC and SF-36 between all three groups at T₂.

Conclusions: Active three-week MT on Magus and Quattro Pro devices resulted in statistically significant improvement measured by WOMAC and SF-36. In the placebo group statistically significant improvement was reached only in WOMAC pain and stiffness subscores after three months posttherapy. Statistically significant differences between active and placebo groups at that time were not present. The power of this trial was not calculated. Groups are presumably undernumbered. Placebo effect is rather high, especially in WOMAC pain and stiffness evaluation. Clinical and functional improvement due to MT has to be questioned. Optimal dosing of magnetotherapy is undefined.

Keys words: gonarthrosis, rehabilitation, functional evaluation, quality of life

**INFLUENCE OF REHABILITATION ON FUNCTIONAL STATUS OF PATIENTS WITH KNEE
OSTEOARTHRITIS**

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Introduction. Osteoarthritis (OA) is a common, chronic, degenerative disease. The main clinical manifestations of osteoarthritis are pain, limitation of motion of the joint and the weakening of muscle strength.

Goal. Evaluation of the functional status of patients with knee OA.

Materials and Methods. The study included 56 patients diagnosed with knee OA, mean age 59 + -5.6 years. The diagnosis was based on X-ray, and in all patients the changes were stage II by Kellgren Lawrence scale. The subjects were divided into two groups. The first group consisted of 30 patients, the other 26. In the first group pelvic applications were applied to the individual kinetic therapy to increase range of motion in the knee with strengthening GMS clinical characteristics (resistance exercises). In the second group with the application of peloid and individual Chinese therapy were treated by interferential currents along the thigh. In both groups the same load level. The mobility of the knee was measured by goniometer and expressed in degrees. GMS thigh was measured by manual muscle test. The measurement was done at the beginning of treatment and after 3 weeks. Results obtained were analyzed using Pearson's (Pearson) χ^2 test, Student's t-test.

Results. After three weeks of intensive rehabilitation treatment in both groups of patients there was a statistically significant disparities in knee range of motion; range of motion of 90 ± 5 degrees ($p < 0,05$). GMS thigh in the first group of respondents to grade 3 + -0.75 MMT-in ($p < 0.05$), the second group 4 + -0.25 MMT-in ($p < 0,05$).

Conclusion. Intensive rehabilitation treatment has a beneficial effect on the functional status of patients with knee OA.

Keywords: knee osteoarthritis; functional disability; rehabilitation

TYPE I COMPLEX REGIONAL PAIN SYNDROME - A CASE REPORT

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Introduction: Complex regional pain syndrome was defined as a variety of painful conditions predominantly distal, which exceeds in duration the usual symptoms during a nociceptive event. In 1994, the International Association for Study of Pain (IASP) proposed the subdivision of Complex Regional Pain Syndrome (CRPS), according to the presence or absence of nerve injury: Type I, formerly known as reflex sympathetic dystrophy, Sudeck atrophy or algoneurodystrophia which does not present nerve injury and Type II: causalgia that has evidence of nerve injury. The pathophysiologic mechanism responsible for this syndrome is still unknown. Type I CRPS can develop after mild trauma, immobilization or disuse. CRPS type II may be due to a lesion of the nerve associated with trauma, metabolic disorders or infectious process.

Materials and methods: We performed a retrospective analysis of a medical record of a 25 year old patient admitted in a Neurology Unit with clinical suspicion of Complex Regional Pain Syndrome.

Results: 25 year old patient presents to the ER with persistent localized pain, for 3 months. Pain was referred to the anterior aspect of the right wrist with elbow radiation. Pain worsened when flexing and extending the wrist which led to functional impotence. Physical examination showed oedema of the right hand, excessive sweating, hypoesthesia in the right forearm and stiloradial and bicipital hyperreflexia unilaterally. Phalen and Tinel were negative. Passive and active range of motion was limited by pain. Proximal and distal interphalangeal of the 2nd to 4th finger of the right hand were flexed. She had no history of trauma or fracture. She was then admitted to a Neurologic ward to further diagnostic evaluation. The patient started medication for her arm pain with NSAIDs, corticosteroids and opioids and a rehabilitation program which consisted in electrical transcutaneous stimulation, passive mobilization of the wrist, contrast baths and Ultrassound.

Conclusions: Early diagnosis and recognition of this clinical condition is extremely important to implement a rehabilitation program both for immediate pain relief and to prevent severe functional impairment.

Key words: Complex regional pain syndrome, algoneurodystrophia, rehabilitation

IMPORTANCE OF JOINT ACTION OF KETOPROFEN GEL AND KETOPROFEN DUO CAPSULE IN THE TREATMENT AND PREVENTION OF CERVICAL SYNDROME

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Introduction: Cervical syndrome belongs to a group of degenerative diseases of the spine. It represents health, social and economic problem. It requires a complex physical therapy and rehabilitation.

Materials and methods: The monitoring was done at the Rheumatology Department of "Institute for Physical Medicine and Rehabilitation Dr M. Zotovic" in Banja Luka. The paper describes patient V.B., student, age 25 years. The first symptoms started a few years ago and deterioration occurred four months ago; severe pain in the neck, without irradiation, which increases with movements of the head in any direction. The pain was intense during the night. He was referred to physiatrist three weeks later, after alleviating pain.

At the first examination as subjective symptoms, patient had severe pain in the neck. The clinical examination of the patient had shown intense pain on palpation spinous extensions, enhanced para vertebral muscle tone, limited mobility of the cervical spine.

The next procedures were applied: kinesis, sonophoresis by Ketoprofen gel, hydrotherapy, education of the patient about protective positions of the cervical spine. Drug therapy of Ketoprofen DUO capsules was applied, too.

Monitoring parameters: visual analogue scale of pain (VAS), subjective and on palpation of spinous extensions, PVM tone, and range of motion in the neck. Measurements were performed at the beginning and at the end of the treatment. Evaluation was done with cervical spine test score (CSS).

The first day of treatment: subjective neck pain of high intensity (VAS = 7), clinical findings - pain on palpation spinous extensions extremely high intensity (VAS = 8), PVM amplified tone, decreased range of motion (Sober = 7cm) (CSS = 70).

Results: The results on the twenty - first day of treatment: subjective pain in the neck very low intensity (VAS = 2), pain on palpation spinous episodes of low intensity (VAS = 5), PVM normotonic, range of motion in the neck increased (Sober = 8cm) (CSS = 25)

Conclusions: The application of the combined action Ketoprofen gel capsules and Ketoprofen Duo has given good results in the treatment of cervical syndrome. Therefore, it is useful in the prevention of this disease.

Key words: cervical syndrome, rehabilitation, KETOPROFEN-gel and capsules

**HYDROSYRINGOMYELIA IN AN ANKYLOSING SPONDYLITIS PATIENT AFTER
STABILIZATION SURGERY**

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Introduction: Ankylosing Spondylitis (AS) is a chronic, systemic, and autoimmune inflammatory disease which mainly affects axial skeleton. It causes rigidity and changes in the biomechanical features of the spine as a result of progressive ossification of the spinal disc, ligaments and ankylosis of the facet joints. In this article, a hydrosyringomyelia case after stabilization surgery is presented.

Case: A 48 - years old woman was admitted to our outpatient clinic with a complaint of numbness, burning pain and gait disturbance in her right leg. She had a medical history of ankylosing spondylitis for 15 years and had underwent stabilization surgery due to bad posture 7 years ago. She complained of numbness starting from her waist, spreading to both her legs and burning pain for the last 1.5 years. The patients complaints increased despite medical treatment. Magnetic resonance imaging of the spine revealed a cystic lesion of the spinal cord at the T8-T9 level with concordant with intramedullary astrocytoma. Also hydrosyringomyelia of 1 cm width at the T10-L1 vertebra levels was detected. At follow-up, she underwent T8-T9-T10 laminectomies, mass excision, syringotomy and duraplasty, and pathology result of the excised material was compatible with fibro - osseous lesion. After operation; numbness, burning pain and gait disturbance in her right leg continued. In her physical examination, the patient was assessed as T10 AIS D and was included in a rehabilitation programme. At the end of rehabilitation programme, she was discharged ambulatory on flat ground and under supervision with a single point cane.

Conclusions: Despite current approaches in ankylosing spondylitis treatment, the disease frequently causes to bad posture due to its progressive course and leads to many secondary problems as well as reducing the patients' quality of life. In treatment of bad posture, many surgical procedures like decompression, stabilization and spinal fusion are used. Many surgical procedures including decompression, stabilization and final fusion could be performed for the treatment of bad posture. In our case spinal cord injury secondary to syringomyelia was detected 7 years after stabilization surgery. Hydromyelia and syrinx are the terms used to define dilatation in central spinal cord. Syringomyelia arises from various primary problems like caudal fossa (chiari malformation), trauma, and spinal canal tumours. Some authors reported syringomyelia progression related to spinal operation. It should be kept in mind that syringomyelia, which is a rare complication, may develop in patients who underwent stabilization surgery.

Key words: Ankylosing spondylitis, syringomyelia, stabilization surgery

ORAL MOTOR ABILITY OF PATIENTS WITH LESIONS RIGHT HEMISPHERE AFTER STROKE

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Introduction: Stroke often causes disturbances of oral motor skills which results in the appearance of speech and language disorders, particularly in patients with left-sided brain damage. For most people the centers responsible for speech and language function are found in the left hemisphere. Right hemisphere is in a minority of people the dominant for speech and language, and its damage does not significantly distort the function, except in patients with a dominant speech and language centers in this hemisphere. Impairments in the execution of speech movements can be disrupted in size, speed, strength and time.

Materials and methods: We tested the ability of oral skills of patients after damage to the right hemisphere of the brain caused by stroke, without the presence of significant speech and language disorders on a sample of 60 patients during the first 3 months in 2013. Patients were analyzed by sex, age, type of stroke lateralization of neurological deficit. Oral skills were tested with subtest of Boston Diagnostic Aphasia Examination (BDAE).

Results: Average age of the sample was 64.33 years ($\pm$ 11.35) with a range of 35 to 84 years. It is interesting that 35.0% of the sample were 60 years or younger. Male gender represented in relation to women (55.0% : 45.0%). The most common was ischemic stroke at 66.7%, the intracerebral hemorrhage with 13.3%, with 1.7% of subarachnoid hemorrhage, and data were unknown for 18.3% of the sample. All patients after stroke had left-sided neurological deficits. Most patients had not significant speech and language impairments. Nonverbal subtest agility is realized with an average of 78.78% success; verbal skill with 83.57% success; subtest speech automatisms with 78.25% success. Subtests of chanting, singing and rhythm average realized with 69.16% success. The results achieved are below the norms prescribed BDAE, but significantly better than in our previous study in patients with left-sided brain damage, that is right-sided neurological deficits to the body. On the test of non-verbal agility none of the patients with right-sided brain damage had achieved a result of lower than 50% of the maximum possible result, and the result of 75% or more was achieved in 70% of the sample. A score of 90% or more was achieved in 30% of the sample. In the test of verbal skills only one patient had a score of less than 71.42% of maximum possible achievements; a score above 90% of the test had 26.7% of patients.

On the speech automatisms test none of the patients achieved lower results than 50% of the maximum possible result, and the result of 75% or more was achieved 63.3% of the sample. On the recitation, singing and rhythm test 23.3% of the sample had a score of less than 50%. Our earlier study of patients present with speech and language disorders following stroke, where most of the patients with right-sided neurological deficits were represented by 87.7%, following results were achieved: the verbal subtest of skill achieved an average score of 45%, verbal dexterity of 48, 57%; speech automatisms of 54.12% and chanting, singing and rhythm 39, 66% success.

Conclusions: Research confirms the dominance of the left hemisphere in speech language function, and the presence of oral motor disorders with right-sided brain damage.
Key words: stroke, oral dexterity, damage to the right hemisphere, speech and language disorders

ABILITY TO WRITE IN PATIENTS WITH SPEECH AND LANGUAGE IMPAIRMENTS AFTER STROKE

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Introduction: Stroke in a significant number of patients has resulted in the appearance of speech language impairments (SLI). For most people the dominant role in speech language function within that function and writing has left cerebral hemisphere. Damage of the left hemisphere arises SLI and contralateral neurological deficits. In most patients with significant SLI there has been damage to modality of written expression. Writing is a complex process that incorporates a multitude of cognitive, linguistic, perceptual, and motor processes. Agraphia or acquired dysgraphia is an impairment or loss of the ability to write caused by brain damage of different etiology in patients who have previously gained the ability to write.

Materials and methods: We tested the ability of writing in 123 patients with ongoing SLI caused by stroke, from July 1st. to Dec.31st 2012 in IPMR "Dr Miroslav Zotović" in Banja Luka. Analyzed by sex, age, type of stroke, neurological deficit and lateralization of body. Writing ability was tested with subtests of Boston Diagnostic Aphasia. Testing was conducted during the first 90 days after stroke.

Results: Average age of the sample was 66.35 years. 28.5% of the sample was 60 or younger. The gender structure of the sample was 52.8:47.2% in favor of males. The sample included 78.9% of patients with ischemic stroke, 8.1% of hemorrhagic stroke and others. The most frequent were patients with right-sided neurological deficits (71.5%), right-sided (26.0%) and bilateral (2.4%). Average number of days from stroke to testing was 35.72 days. There were 8 illiterate patients in the sample (6.5% of the sample). Of 125 patients who previously knew how to write, 67% of patients have lost the ability to write and 33% did not. Of 88 patients with right-sided neurological deficits of the body, five were illiterate and in the other 83 patients the ability to write was absent in 79.99% of this category. Of the 32 patients with left-sided neurological deficits three were illiterate and in the 29 remaining the writing ability was present in 82.75% of this category of patients.

Of the patients with right-sided neurological deficits of the body the success of the test in dictated words was 20.12%. In dictating of sentences and narrative writing 81.92% of the patients were unsuccessful. Patients with left-sided neurological deficits of the body in dictating words have successfully solved 82.75% of the test. 31.03% of the patients were unsuccessful in the dictation of sentences test, and 27.58% were unsuccessful in narrative writing.

Conclusions: Research confirms the dominance of the left hemisphere in speech language function, both in oral and written modality. Most patients with right-sided neurological deficits (left-brain lesions) and present SLI, had impairments the modality of writing. Most of the patients with left-sided neurological deficits bodies (right-sided brain lesions) and present SLI, retained the ability to write.

Key words: stroke, agraphia, writing ability, speech and language impairments

SPEECH REPETITION ABILITY AFTER STROKE

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Introduction: Left hemisphere stroke often causes speech and language difficulties. One of difficulties is repetitive speech.

Materials and methods: We compared the ability of repetitive speech in patients with speech and language difficulties after stroke with the side of the body that was damaged by stroke. The sample consisted 123 patients who were tested from June to December 2012, during the first 90 days after stroke. The sample was analyzed by sex, age, type of stroke and lateralization of neurological deficit. Repetitive speech was tested by Repetition Subtests of Boston Diagnostic Aphasia Examination (BDAE).

Results: The sample of 123 patients who were included in speech and language assessment and treatment had an average age of 66.35 years. 28.5 % of the sample had 60 years or less. There were more males than females in the sample (52.8: 47.2%). The most common stroke types were ischemic (78.9%) and hemorrhagic stroke (8.1%). Most patients had right - sided neurological deficits of the body and left hemisphere lesions (71.5%), right hemisphere (26.0%) and 2.4% bilateral lesions. On average, patients were tested 35.72 days after stroke and 50% of the sample was tested in the first 25 days after stroke. 68.3 % of the sample had significant speech and language impairments and therefore were included in speech and language therapy. Success at the word repetition subtest was 76.99 %, at high probability sentence repetition subtest 70.93 % and at small probability sentence repetition subtest 66.87 %. There is not significant correlation between the number of days from onset of stroke, age of the patients and the success of all subtest. Patients with left-sided neurological deficits of the body achieved better results at high probability sentence repetition subtest than patients with right-sided neurological deficits of the body (94.92% : 61.22%). Patients with left - sided neurological deficits of the body achieved better results on word repetition subtest than patients with right-sided neurological deficits of the body (98.75%: 68.29%). Patients with left-sided neurological deficits of the body achieved better results at small probability sentence repetition subtest than patients with right - sided neurological deficits of the body (89.84%: 57.38%).

Conclusions: Better achievements on repetition subtests in patients with left - sided deficits indicate a minimal damage to speech and language centers, while worse achievements of patients with right-sided neurological deficits indicate significant damage to centers responsible for speech and language functions. The relatively high success on all sub-tests (between 57-68%) provide the ability to use repetition in planning the initial speech and language treatment of stroke patients.

Key words: stroke, repetition, speech and language impairments

APHONIA – A DIAGNOSIS CHALLENGE

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Introduction: Functional voice disorders are common and include conversion aphonia/dysphonia, habituated hoarseness, vocal abuse syndrome, postoperative dysphonia. The development of conversion aphonia, also referred to as a psychogenic dysphonia, may result from a temporally related psychologically/emotionally traumatic event. Conversion disorder is an exclusion diagnosis in which symptoms are not intentionally produced or feigned by the patient. The patient's vocal quality is usually hypofunctional or aphonic. Below, we present one case study to illustrate the current challenges of diagnosis of conversion dysphonia.

Case Report: A 43-year-old woman, pharmaceutical technician, was observed in April 2013 referred by primary health care for voice rehabilitation. She had no surgery history and had medical history of asthma and tobacco (20 pack year smoking history and in cessation tobacco program 1 month ago). She was only medicated with simvastatina. In January 2013 she presented acute onset of aphonia, on short and long-run sentences, without others symptoms. It was excluded recent upper respiratory infection, vocation (ie, singing, athletic coaching) and misuse of the voice.

In the initial assessment she had normal neurologic exam with cough and deglutition reflex present. Oropharyngeal exam and pulmonary analysis revealed normal exhalation before phonation and normal chest excursion. Voice Handicap Index scale scored 84 points (total 120 points). In an additional work-up hormone (TSH, T4 and T3 hormone levels) were taken and showed normal levels. She initiated speech therapy (ST) with auditory feedback, head positioning, laryngeal massage, and relaxation. She was referred to otorhinolaryngology and had done laryngoscopy that demonstrated diminished vocal cord adduction during speech. Based on symptoms and clinical history, it was established the diagnosis of conversion aphonia precipitated by anxiety due to recent initiation tobacco cessation program. She was medicated with alprazolam 1mg twice/day and was referred to Psychiatry. Within 3 weeks of ST, she improved the symptoms, had occasional aphonia worsening in end of the day, and scored in Voice Handicap Index scale 59 points.

Conclusions: Aphonia/Dysphonia conversion disorder is an exclusion diagnosis. It's a diagnosis challenge, particularly if there were no psychiatric/emotional history. A complete medical examination should be completed to rule out any possible organic or neurologic cause.

Flexible endoscopic evaluation reveals vocal folds adduct during coughing, laughing, etc..., but not during communicative speech. Therapy addressing the underlying emotional and psychosocial issues should be taken: pharmacological treatment has been reported with tricyclic antidepressants however its efficacy has been reported only after 8 weeks. As this case illustrates speech therapy can improve and optimize voice management particularly in the acute phase.

Key words: Aphonia; Speech Therapy; Conversion disorder

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**EFFECT OF LOWER URINARY TRACT SYMPTOMS ON QUALITY OF LIFE IN PATIENTS
WITH MULTIPLE SCLEROSIS**

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Introduction: Normal lower urinary tract function depends on neural integration between the peripheral and central nervous system. Multiple sclerosis (MS) may cause neurogenic lower urinary tract dysfunction (NLUTD). Percentage variables between 50% and 90% have been reported in the literature. Overactive bladder, combined with urgency, frequency, nocturia and urge incontinence is the most common syndrome. Sometimes voiding dysfunction and urinary retention are leading symptoms. NLUTD represents severe limitation in daily activity and quality of life. A good understanding of negative effects of urinary symptoms on quality of life of patients is important to optimize treatment. So the aim of our study was to determine the impact of lower urinary tract symptoms (LUTS) on quality of life in patients with multiple sclerosis.

Materials and methods: Enrolled were 22 patients aged 36 to 66y, 18 women (mean age 49.4y, SD 8.1) and 4 men (mean age 50.7y, SD 8.1). Patients completed SF-36 and Qualiveen – short form questionnaire. The history of LUTS was taken.

Results: Health related quality of life was in all SF-36 domains below norm based. Urinary symptoms had substantial impact on quality of life. LUTS significantly correlated with role emotional domain of the SF-36. There were no significant correlations between SF-36 domains and Qualiveen – short form questionnaire.

Conclusions: LUTS have negative effect on quality of life in patients with multiple sclerosis. Due LUTS emotional role is mostly affected.

Key words: multiple sclerosis, lower urinary tract symptoms, quality of life

CHEMICAL NEUROLYSIS WITH PHENOL: CASE REPORT

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Introduction: The chemical neurolysis is the percutaneous injection into the nerve or muscle of a chemical agent (phenol, alcohol, or botulinum toxin - BT). This therapy aims at reduction of focal spasticity that interferes with the rehabilitation program or with the functionality. It may also provide pain reduction.

This paper aims to demonstrate the benefits of using phenol 6%. Phenol is a neurolytic agent. It's a non selective agent and the degree of destruction is directly correlated with the concentration and the amount used. It causes the destruction of the myelin sheath of the fibers, with preservation of the endoneurial tube. There may be some axonal destruction. It interrupts nerve conduction and the reflex arc, decreasing muscle tone. It is indicated in motor nerve neurolysis. It has many advantages such as low cost, immediate decrease in muscle tone, high power and long term effect. Adverse effects are rare but have to be taken into account: temporary soreness at the injection site, dysesthesia and tissue fibrosis.

Clinical case: Male, 64 years old. He suffered an ischemic stroke (right middle cerebral artery) at 30/07/2009, with installation of left hemiplegia. Admitted to a Rehabilitation Center during the following periods: 18/11/2009 to 25/01/2010, 27/03/2011 to 07/05/2011 and 04/06/2012 to 07/07/2012. During the second hospital stay, infiltration with BT was made to the left upper limb (subscapularis, pectoralis major, biceps brachii, triceps brachii and brachioradialis muscles).

Oral anti - spastic: baclofen 25 mg, tizanidin 6 mg.

At the last inpatient admission:

Left Upper Limb: muscle strength grade 0. Spasticity grade 4 (Modified Ashworth Scale).

Shoulder: anterior elevation: 0°, lateral elevation: 40°, external rotation: 45°.

Elbow: flexion: 90°, extension: -45°, painful.

During hospitalization an infiltration with phenol 6% was made in the musculocutaneous (1 ml) and the pectoralis lateral nerves (1 mL). After neurolysis it was possible full elbow extension and a lateral elevation of 90°, painless, facilitating the dressing/undressing and hygiene care. The infiltration points were identified by electrical stimulation at 0.7 mA.

The procedure went without immediate complications and there were no side effects.

Conclusion: The chemical neurolysis with phenol is a valid therapeutic option for patients with focal spasticity. It is a safe and effective technique that is characterized by a low cost and with immediate results. It has special relevance in nerve neurolysis of major muscle groups since these muscles easily reach the maximum dose of BT without the desired results. Note that the simultaneous use of phenol and BT is a viable option. This way, we can provide an appropriate and effective rehabilitation program to our patients with less pain, facilitating the hygienic care and providing greater autonomy in activities of daily living.

Key words: Phenol, neurolysis, stroke, spasticity

ACUTE INTRATHECAL BACLOFEN WITHDRAWAL: CASE REPORT AND A BRIEF REVIEW OF TREATMENT OPTIONS

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Introduction: Baclofen is considered to be the drug of choice for treating spasticity of spinal and cerebral origin. Oral baclofen does not effectively cross blood - brain barrier. The precise mechanism of action of baclofen as a muscle relaxant and anti - spasticity agent is not fully understood however it reduces increased muscle tone, Babinski sign, tendon reflexes, ankle clonus and sometimes decreases muscle force.

Patients who fail to respond to oral baclofen or who have significant side effects at therapeutic doses of oral baclofen can benefit from Intrathecal baclofen (ITB) delivered by a programmable implanted drug infusion system.

ITB pump has been used effectively with increasing frequency in patients with severe spasticity. It is implanted in the lower abdomen and dispenses medication from its reservoir through a silicon catheter into the thoraco - lumbar region intrathecally.

Mechanical drug delivery systems provide certain therapeutic advantages, but human errors or device malfunctions can occur. Either can cause drug over - or underdosage or the sudden cessation of drug administration. Symptoms of ITB withdrawal most often are limited to return of the patient's baseline spasticity and rigidity. Abrupt withdrawal can simulate several conditions like autonomic dysreflexia, malignant hyperthermia, serotoninergic syndrome, sepsis, meningitis or neuroleptic-malignant syndrome. In a minority of patients, the sudden withdrawal of ITB caused a life threatening syndrome. Exaggerated rebound spasticity is the earliest symptom and can be associated with tachycardia, fever, labile blood pressure or hypotension and seizures or diminished level of consciousness.

Materials and methods: Case report of a 41 years old man who developed a ITB withdrawal syndrome. The authors also included a literature review. We searched on PUBMED and ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION databases using the keywords "intrathecal", "baclofen" and "withdrawal" to identify studies (published up to December 2012) that focused on presentation or treatment of acute withdrawal state in ITB therapy.

Results: The man has a past medical history of C7 neurological level spinal cord injury secondary to trauma 14 years ago and implemented a baclofen pump 10 years ago. A couple of hours after the pump substitution, he developed hyperthermia, hypotension and tachycardia, neurological impairment, acute renal failure and multisystem organ failure leading to a full - blown intrathecal baclofen withdrawal syndrome.

Pump analysis on the day after revealed that there was no catheter or pump failure but it was identified a catheter refill-programming error.

He was treated effectively with supportive care, high - dose benzodiazepines and reinstitution of baclofen pump.

Conclusions: The episodes of intrathecal baclofen withdrawal are mostly caused by preventable human errors during the surgical procedure and pump programming or pump malfunction. Therefore we suggest that a checklist procedure should be created and used as a guide in order to don't fail any of the steps that ensure a correct refilling of baclofen pump. Oral baclofen replacement may not be an effective method to treat or prevent intrathecal baclofen withdrawal syndrome. The increase frequency of intrathecal baclofen use on severe spasticity should raise the clinical suspicion given to these clinical features.

Key words: Baclofen pump; spasticity; intrathecal; withdrawal

OMISSIONS AND ERRORS IN THE TREATMENT OF SCHOOL CHILDREN WITH FLAT FEET

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Introduction: Flat feet (FF) are common in pediatric practice, characterized by a lowered arch. The most common subtype is flexible FF. In most cases it is physiologic, asymptomatic condition which improves with age in the first decade of life. Sometimes causes symptoms and functional problems with the progression of the foot deformity and the treatment is necessary. Modern algorithms for examination of the FF deformity, allow proper choice of treatment.

The aim of this cross-sectional study was to determine in school children the frequency and severity of FF deformity, symptoms and dysfunction and analyze the therapy, with giving specific guidance for future medical practice.

Materials and methods: 236 pupils aged 7-12 years were undergone the test FPI-6. Those diagnosed with flat feet have been systematically clinically examined. We followed the degree of foot deformities by gender, age, BMI, symptoms and dysfunctions, associated deformities of knee, hip and spine. Data were analyzed according to the total number of FF. All statistical analyzes were performed with SPSS version 19.0.

Results: ¼ of of children has no symptoms or dysfunction. Symptoms are in 37% of the children, of which 16% without dysfunction. In 59% of children there are functional dysability. With age, children with FF have a higher frequency of symptoms and intensity of pain. Symptoms are more common in underweight and obese children. Half of the children with skew foot have symptoms. The pain is localized in the foot 52%, lumbar spine here are 18% children with painful feet, 70% of them have an easy pain, 30% moderate pain, neither one severe pain. Foot pain was mostly localized in the heel and sole (by 26.5%), and in the area of the accessory navicular bone 18%. Children with painful knees had significantly heavier deformity of rear part of the foot. Foot injuries and a tendency to fall are reported in 21% of children, and their deformity was significantly heavier. Children with pain in the lower back in 66% reported about foot trauma, the non-parametric Spearman correlation test indicates medium degree of correlation between lower back pain and trauma ($r = 0.328$, $p = 0.003$). Children with painful FF in 43% of cases were treated with foot orthotics, and their deformity was significantly heavier than the untreated children. 57% of children with symptomatic FF is not treated. 10% of children without diagnostic criteria for pathological flexible FF were treated with orthotics.

Conclusions: this study points the alarming fact: unsystematically history taking and failure to implement a standardized clinical examination in today's medical practice leads to a faulty diagnosis and inadequate treatment in thirds (32.5%) of children with FF, imposing urgently need for establishment a national algorithm in clinical examination, diagnosis, and treatment for FF, with evidential databases to allow the proper choice of therapy, monitor therapy effects and evolution of foot deformity.

Key words: Children, flat feet, errors, treatment

**THE MOST FREQUENT DEFORMITIES OF MUSCULOSKELETAL SYSTEM IN
PRESCHOOL CHILDREN**

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Introduction: The most frequent appearance of physical deformities of children in preschool, can occur in the lower extremity, in the sense of losing normal, physiological vault of the foot – flat feet (pedes plana)

The aim: To present level of presence physical deformities of children in preschool

Method: Systematic review of medical physiologist in the department of Physical medicine and Rehabilitation in the Health Home in Nis in the period of school year 2012/2013 were included 2680 children, girls 1350 (50.37%), boys 1330 (49.62%).

Results: Specialist examination musculoskeletal system of children aged six years detected the functional changes and the different degree of deformity. The most frequent is deformity of flat feet

total of 1728 (64,47%) children. Out of that number girls were 933 (53.99%) and boys were 794 (45.94%). Endemic display, according to place where live, children from urban areas 1292 (74,76%), children from village areas 435 (25,17%).

Conclution: Children in preschool, flat feet presents the most frequent deformities musculoskeletal system. Becouse of consequences in older age, who can appear in the form of disorder of functions of the joints: knees, hips and spine. Their timely discovery and correction is very important.

RESPIRATORY REHABILITATION PRETERM NEWBORN - CASE REPORT

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Introduction: A preterm newborn child is born before the 37 weeks of gestation. Complications that most commonly occur in these children were from the respiratory system and are manifested as respiratory distress or bronchopulmonary dysplasia. Afebrility child's, respiratory rate below 60/min., $\text{SaO}_2 > 95$, the absence of intracranial hemorrhage were prerequisites that must be met to start a respiratory rehabilitation. With the procedures of respiratory rehabilitation in premature newborn starts while the child is in an incubator.

We present a case of a newborn, gestational age 31 weeks born emergency Caesarean section in the second pregnancy complicated gestational diabetes mellitus. Body weight at birth was 1650 g and Apgar scores 5/7. The child was 18 days in the intensive care unit in respiratory support, 10 days in a mode of mechanical ventilation was applied and 8 days HOOD oxygen therapy.

Respiratory rehabilitation is started, by the stabilization of general condition, included gentle massage of the chest, turning on side and exercises for the chest expansion. Respiratory rehabilitation program was carried out twice a day. On the tenth day, the child is separated from the ventilator. HOOD oxygen therapy was continued and started intensive physical treatment using the aerosol therapy, chest massage, positional drainage and breathing exercises. The child was dismissed after 31 days of hospitalization with satisfactory gas analysis in good condition.

Conclusion: Use of respiratory rehabilitation with the premature newborn intensive care and treatment measures improve recovery of these small patients.

Keywords: preterm newborn, rehabilitation, respiratory support

THE MEASUREMENT OF SEGMENTAL COLONIC TRANSIT IN CHILDREN WITH BOWEL BLADDER DYSFUNCTION

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Introduction: The International Children's Continence Society had recently proposed the term "bowel bladder dysfunction" (BBD) to be used instead of the term "dysfunctional elimination syndrome" describing the children with a combination of functional bladder and bowel disturbances. Children with BBD complain of urinary frequency and incontinence, non-monosymptomatic nocturnal enuresis, voiding dysfunction, recurrent urinary tract infections and chronic constipation. It is relevant to identify bowel dysfunction because it has been shown that treatment of constipation significantly reduces lower urinary tract symptoms. Two different types of chronic functional constipation have been identified in children based on colonic transit time (CTT) measurement: a more generalized and severe form known as slow-transit (ST) constipation and a segmental type known as functional fecal retention (FFR). Both entities present with similar symptomatology but involve different pathophysiological mechanisms and require different treatment strategies. Therefore, the aim of the study was to evaluate the types of constipation according to the CTT in children with BBD, and to compare the results with transit type in children with chronic functional constipation without voiding dysfunction (constipation group) and children with normal bowel habits (control group).

Patients and methods: One hundred and one children were included in the study and their medical histories were obtained. Physical examination including a digital rectal examination was performed, together with the measurement of rectal diameter by transabdominal ultrasound and radionuclear transit scintigraphy. Children with BBD additionally kept a voiding diary, and underwent urinalyses and urine culture, ultrasound examination of bladder and uroflowmetry. In order to evaluate the transit pattern, colonic scintigraphy was performed in all children according to a standardized protocol. The radiopharmaceutical was prepared by adding diethylene-triamine penta-acetate labeled with 99m-Tc pertechnetate to granular carbon and administered orally. Sequential images of the abdomen were taken at 4, 8, 24, and 48 hours after ingestion. Segmental colonic transit was analyzed visually and semi-quantitatively by calculating the geometric center from the different anatomic regions of the colon. Patients were categorized as having either slow-transit (ST), functional fecal retention (FFR) or normal transit. Results were compared between the groups.

Results: FFR was diagnosed in 31 out of 38 children with BBD and 34 out of 43 children in the constipation group. ST was found in 7 children with BBD, compared to 9 children in the constipation group. The control group children demonstrated normal colonic transit.

Conclusions: Colonic scintigraphy should be considered in chronically constipated children who failed conventional treatment. It allows accurate assessment of segmental colonic transit. FFR was diagnosed in most children with BBD. However, some children suffered from ST constipation. The differentiation between these two types of constipation is clinically significant because they require different treatment.

Key words: dysfunctional elimination syndrome, colonic scintigraphy, constipation, functional fecal retention, slow-transit constipation

PHYSICAL THERAPY IN PATIENT WITH ARTHROGRYPOSIS - CASE REPORT

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Introduction: Arthrogryposis presents congenital anomaly with various degrees of limbs affection and contractures. The purpose of this study is to present patient admitted after birth and was included into continous physical therapy in hospital and rehabilitation centers for the porpuse of contracture solving, orthopedic treatment and functional recovery.

Material and Methods: The child was trasnfered from Obstetrical clinic in 6th day of life. Neruological and clinical examination was preformed as well as X ray of upper and lower limbs, ultrasound of central nervous system and abdomen, as well as electromyography. The patients was included into physical therapy with regular check-up of functional status.

Results: Clinically on admission there were contractures in joints on both upper and lower limbs, muscle hypotrophies and hypotony with opistotonus and clubfoot. Radiographic evaluation revealed clubfoot and right hip luxations. ECHO revealed no associated anomalies. Electromyographic evaluation revealed reduced number of motor units with signs of neuropathic changes in evaluated muscles on limbs, especially on upper limbs. At the beggining of treatment thermo and kinezi therapy was induced with splints, while in later stages electrotherapy, hidrotherapy, occupational therapy were additionally added with stimulation of motoric development. On latest check-up, child age of 3 years, after complete orthopedic treatment of hip luxation and clubfoot deformity, patient is able to walk independently with reduced movements in upper limbs but educated to perform simple tasks associated with upper limbs.

Conclusion: Arthrogryposis is complex congenital anomaly with heterogenous clinical expression leading to severe handicafe and normal mental development, thus demanding continuous treatment and follow-up untill the end of growth and development in order to achieve maximal functional recovery and independence in performing of daily tasks activities. It is important to stress out that favorable results could be achieved only with team work of physiatrists, physiotherpists, orthopedic surgeons, psychologists, social workers and parents.

Key words: arthrogryposis, physical therapy, children

SY ELLIS-VAN CREVELD

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Introduction: SyELLIS-VAN CREVELD (EVC) is also called chondroectodermal or mesoectodermal dysplasia (but this names do not define the entity enough and they are not satisfactory for general use). The EVC represents a rare genetic disarangement like skeletal dysplasia. It is an autosomal recessive inherit and frequency is 1 to 60 000 newborns but in some isolated human populations is more common and frequency can be until 13 %. Sy EVC is caused by mutation of EVC gene on short arm of the 4th chromosome (4n16). The frequency is same at boys and girls. Pathophysiological is the notised disorganisation of hondrocits in ephiphysis zones where long bones grow and also in central physeal zone where vertebres grow. Clinical signs of EVC are skeletal deformations and heart defects. The concequences of cardiovascular problems can cause that in early childhood in 50% of cases and the ones that survive have a normal life and by the most of them level of intelligence is normal. Sceletal deformations are also noticed such as: disproportionante dwarfism with an average growth from 109 cm - 155 cm, acromesomelic, progressive distal shortening of extremites, axial deformities of limbs, genu valgum, polydactylia is mainly present on hands and in 10% of cases on feet, distal and medial phalangs are shorter than proximal, nails are hipoplastic or completely absent, diferent types of carpal fusion, lumbar lordosis, low-set shoulders, narrow torax with short and also narrow ribs (this can very often cause respiratory problems) deformites of teeth and malocclusion, oral lesions... We rearly meet problems such as: genitourinary anomalies, CNS anomalies, mental retardation, congenital lack of bile duct. Because of complexity of the problem, team theatment is necessary (clinical geneticis, pediatrician , pulmonologist, cardiologist, orthopedist, physician, dentist, phychologist ...etc).

Purpose: of our work is to present you an 18-years old girl with Sy EVC.

Methods: This girl have had from her early childhood until now a lot of orthopedic corrective operations (in our country and also abroad). After all this operations the medical thretment is taken. Three medical threatments have been taken in our institution.

Results: We want to inform the public with this rare disease, to show direction of disease and orthopedic threatment and as well as results of balneo physiotherapy threatment.

Conclusions: We cann all make a common conclusion that continuiously and intensive physical threrapy threatment is necessery.

Key words: Sy Ellis - van Creveld

REHABILITATION OF A BOY WITH PRADER WILLY SYNDROME

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Introduction: Prader Willy syndrome is rarely appeared, it is caused by lack of genetic material on fifth chromosome. The most often symptoms of PWS are: muscular hypotonic, extreme hungriness, growth of weight between age 1 – 6, thin face, almond shaped eyes, small mouth with thin upper lip and slouch ends, incomplete sexual development, retardation, small growth, small palms and feet, speech problems.

Materials and methods: 13 years old boy, treated in our Institution for few times because of retarded psychophysical development. The boy is from second, regular pregnancy, birth in term, immediately after birth he was cured on intensive treatment ward of pediatric clinic in Banja Luka, because of cyanogen crisis and surgery of left kidney because of hydronephrosis. He was released as flabby baby. In age of eight months because he had often pneumonias and expressed flabbiness he was admitted at Institute for child and mother in Belgrade, where the examinations were done and diagnosis was verified. He started to walk in the age of 5 years, in this period his chewing was improved and he started to drink from a glass. Micturition control was not established. In the work with the boy, multidisciplinary approach was applied; he was treated by the special pedagogue, speech therapist, psychologist and he was categorized as moderate mental retardation. Apply of hormone of growth was proposed, but parents refused. On the examination the boy doesn't cooperate, adipose, low growth, palms and feet small, short torso. Independently mobile with stand by full feet, extended knees on wider base. The boy performs crouch and upstanding partially, sits independently with kyphosis of the trunk, he crawl on buttocks, occasionally he stand on his knee and hands, backbone kyphotic, shoulders in protraction.

Results: The boy was included in rehabilitation program / treatment due to Bobath concept (the mother was trained) what resulted with crouching and better walk.

Conclusions: As conclusion we may say that rehabilitation is long term process and it may help to the children with PWS.

Key words: Prader Willy syndrome, rehabilitation therapy

DRAVET SYNDROME

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Introduction: Dravet Syndrome (DS) is a rare and severe form of infantile - onset epilepsy whose main distinctive feature is that seizures are precipitated by fever. Seizures tend to present at around 6 months of age, with multiple seizure types and convulsive status epilepticus; episodes are frequent, often monthly and refractory to some medication. Children with DS are developmentally normal until onset of seizures. Some individual factors like genetics, frequency of seizures and age at onset seem to be correlated with the degree of developmental impairment. In 85% of the patients, a SCN1A mutation can be identified; the subsequent sodium channel dysfunction may confer a unique profile of brain vulnerability to the brain.

Our aim is to report a case of a child with DS, focusing on treatment and the role of Rehabilitation and Physical Medicine.

Materials and methods: To date, no single drug has proved to be effective in most patients. Valproic acid, levetiracetam, zonisamide and topiramate have shown positive effect; phenytoin, carbamazepine and lamotrigine have proved that can worsen seizures and should be avoided. In two class I trials (phase III), the association of stiripentol with valproate and clobazam has had good results. Alternative approaches have not been systematically studied yet. Outcome is poor, with progressive disturbance in cerebral function in most patients (epileptic encephalopathy) and ongoing seizures. Seizures persist into adulthood as brief nocturnal convulsions and a characteristic deterioration of gait.

Results: We report a 2-years-old boy who had experienced repeated episodes of febrile and subfebrile refractory seizures and status epilepticus since 5 months of age, usually triggered by fever associated with respiratory infections. DS was diagnosed at the age of 18 months and after that, he change medication to valproic acid and topiramate and went on a respiratory rehabilitation program aimed to reduce respiratory events. In this case, seizures usually went along with respiratory infections, so that we thought that by preventing it and reducing its severity, we would reduce the frequency of seizures. A reduction in frequency of respiratory events and seizures was noticed.

Conclusions: DS illustrates a rare and severe form of infantile-onset epilepsy in which seizures are triggered by fever and respiratory infections. In our opinion, respiratory rehabilitation may have a role in such cases however, it is difficult to ascertain if it was the respiratory program or the drugs that resulted in seizure reduction. Besides that, another unanswered question is whether this attempt to reduce seizures will affect the epileptic encephalopathy and cognitive outcome. Further studies are needed.

Key words: Dravet Syndrome, epilepsy, respiratory rehabilitation

TYPE I LISSENCEPHALY – CASE REPORT AND LITERATURE REVIEW

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Introduction: Lissencephaly has long been recognized as a cause of intellectual disability. Traditionally, it has been separated into 2 categories: type I or classical type, and type II or cobblestone lissencephaly. It has an overall incidence of 1.2/100,000 births. Type I is a rare developmental disorder which results from a defect of neuronal migration, and can be associated with other brain and visceral anomalies. Although, most forms have a genetic origin, lissencephalic - like syndromes may result from several environmental insults or from maternal diseases.

The purpose of this case report is to describe the natural course of type I lissencephaly, options of rehabilitation care and clarify prognostic information available.

Material and methods: The authors report a clinical case of a 21-month-old boy with complex brain malformation and severe developmental delay. We describe the patient's clinical history and the main characteristics of lissencephaly syndrome.

Results/Discussion: The patient is a boy born at 36 weeks of gestation via uncomplicated spontaneous vaginal delivery to a 30-year-old primigravid mother. The mother, who was otherwise healthy, had an uneventful pregnancy. On delivery, the patient's first and fifth minute Apgar scores were 8 and 10, respectively. At his 4th month of age, he was admitted on Paediatric nursery by epileptic seizures. EEG recordings showed the presence of paroxysmal generalized activity. Brain MRI revealed signs of classical lissencephaly and dysgenesis of corpus callosum. He was evaluated for the first time, in our consultation on February 2012 with 5 months of age, and immediately started rehabilitation treatment.

Currently, the child is 21 months old, he shows: microcephaly; some signs of recognizing the parents and stimulus - related laughing, purposeful movements and sounds, ability to interact and establish eye contact; no grip skills; no head or trunk balance with decreased muscular tonus, and hypertonia of lower limb. We prescribed him a customized wheelchair, an AFO, reinforced rehabilitation treatment measures and recommendations for feeding and other daily cares. It is also crucial to maintain close surveillance of oropharyngeal incoordination.

Lissencephaly is a cerebral cortical malformation that should be considered in children with developmental delay and it should always be investigated in the etiology of early - onset epilepsy. MRI is considered the best neuroradiological study to identify this disorder. Somatosensory - evoked potential examination could be supplemental for predicting the neurologic prognosis.

The degree, distribution and detailed structure of lissencephaly vary widely and the clinical features are accordingly diverse. A precise analysis of each case is necessary to establish the prognosis and risk of recurrence.

Not much has been published on the follow-up of patients with lissencephaly or their life expectancy. The prognosis is considered to be extremely poor. Living patients may show profound mental retardation, spastic quadriplegia and epilepsy.

Conclusions: Life expectancy in Lissencephaly is limited, but with supportive care focused on the stimulation of neurodevelopment, prevention of infectious, swallowing and musculoskeletal complications, many of these children can reach adulthood. It is fundamental a pluridisciplinary team evaluation, prompt rehabilitation treatment planning and careful follow-up.

Keywords: Lissencephaly; developmental delay; epilepsy

NEUROLOGICAL IMPAREMENT AND TYPE OF AFFECTION OF THE PERIPHERAL NERVES IN CHILDREN WITH SPINA BIFIDA OCCULTA

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Introduction: Spina bifida is a congenital disorder that involves incomplete development of the spinal cord and its meninges. Spina bifida is developed at the end of the first month of pregnancy when the two sides of the embryonic spine fail to join, leaving empty space. It is known that 5-10% of the general population may have a less severe form of spina bifida, but in most cases the damage is limited to one or two spinal vertebrae. Occult spinal disorder in children can manifest varying degrees of neurological impairment in the lower limbs. Data from literature indicates frequent involvement of the peroneal nerve deficit in these patients.

The aim of this paper is to examine type and degree of neurological impairment, and type of affection of peripheral nerves of the lower limbs in children with occult spinal disorder.

Materials and methods: This is a retrospective study conducted on the group of 40 patients treated at the University Children's Hospital in Belgrade from 2001 to 2006. In this observational study we recorded pathological findings in functioning of peroneal and tibial nerve and also a degree of the impairment as: paralysis or paresis.

Results: In the observed group of children we found 30 children with paresis and 10 with paralysis as a form of neurological deficit. Nineteen children with paresis had affected the peroneal nerve and in 11 children with paresis had affected by tibial nerve. In the group of children with paralysis five children had pathological findings of the peroneal nerve while the three children had damaged tibial nerve. Two children had pathological findings of both observed nerves.

Conclusions: It can be concluded that paresis of lower limbs is significantly more frequent than paralysis in children with diagnosed occult spina bifida. Also we found out that these children more often have paresis as if paralysis of peroneal than the tibial nerve.

**THE IMPACT OF THE METABOLIC SYNDROME ON RESPIRATORY REHABILITATION
EFFECTS IN COPD PATIENTS**

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Introduction: The chronic obstructive pulmonary disease is a chronic inflammation of the airways and pulmonary parenchyma inducing a constriction of the airways which is partially irreversible despite the applied treatment. COPD is a systemic disease, affecting not only the lungs, but other organs and systems as well. The diagnosis and severity of COPD is often camouflaged by concomitant diseases. According to the latest definition of COPD and recommendations of the Global Initiative for Chronic Obstructive Lung Diseases (GOLD), besides the pulmonary symptoms, concomitant diseases and conditions should also be routinely investigated in each COPD patient, thus enabling a modern and comprehensive approach to chronic pulmonary patients, in terms of investigating the presence of metabolic disorders. The objective of this study was to establish the presence of the metabolic syndrome components (according to the National Education Program in the United States, NCEP-ATP III) in COPD patients, defining the impact of the metabolic syndrome on the respiratory rehabilitation effects, as compared to COPD patients with no components of the metabolic syndrome registered.

Materials and methods: Thirty-five patients with the diagnosis of COPD, treated in the Institute for Pulmonary Diseases of Vojvodina, Sremska Kamenica (Serbia), were evaluated for the presence of the metabolic syndrome components. The clinical definition of them metabolic syndrome (according to NCEP-ATPIII) is based on the presence of three of five criteria: abdominal obesity (the waist measure >102 cm for males, and >88 cm for females); elevated triglyceride levels on an empty stomach (>1.7 mmol/l), or a former history of this disorder treated; decreased HDL levels (<1.03 mmol/l for males and <1,29 mmol/l for females, or a former history of this disorder treated; an elevated systolic and/or diastolic pressure of > 135 mm Hg and > o 85 mmHg respectively; elevated blood glucose levels on an empty stomach (> 5.6 mmol/l), or already existing type 2 diabetes mellitus. Having measured the metabolic components, the patients were classified into two groups: Group I (8 patients) with registered metabolic syndrome components, and Group II (27 patients) with no metabolic syndrome components registered. Both groups were enrolled in the 10-day hospital rehabilitation program, which included breathing, strength and endurance exercises, performed for 30 minutes, twice a day. The following parameters were measured in both groups, before and after the rehabilitation: FEV1, ITGV, sat O2, 6 mwd test, BMI, Borg's Dyspnea Scale, MMRC Dyspnea Scale, BODE index.

Results: After the 10 - day respiratory rehabilitation, the following parameters were improved: 6 mwd test, Borg's Dyspnea Scale score, ITGV and MMRC Scale scores, consequently, the BODE index values significantly improved in Group II, as compared to Group I ($p<0,05$). Other parameters were not significantly altered.

Conclusions: The respiratory rehabilitation program obviously had weaker results in Group I, suggesting the presence of the metabolic syndrome may diminish the benefits of respiratory rehabilitation in COPD patients.

Key words: COPD, respiratory rehabilitation, metabolic syndrome

THE IMPACT OF A CARDIAC REHABILITATION PROGRAM ON MEN'S SEXUAL HEALTH

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Introduction: Erectile dysfunction (ED) shares pathophysiology and risk factors with cardiovascular disease (CVD). Cardiac Rehabilitation Programs (CRP) are intended to address and improve all aspects of the patients functioning and well-being: physical, psychological, and social, including sexual activities. Few studies have addressed the topic of sexual function in cardiac rehabilitation patients. The purposes of this study were to determine the effects of CRP on sexual function in male patients with CVD and the factors which influence sexual function after these programs.

Materials and methods: A prospective cohort study was performed, including male patients who completed an hospital based CRP (Phase II), between October 2012 and March 2013. Demographic and clinical information were collected. Functional capacity was estimated in METs (metabolic equivalents) achieved in treadmill exercise test at the beginning of CRP and three months later. Erectile dysfunction was assessed using the International Index of Erectile Function (IIEF) questionnaire and Quality of Life through the SF-36 Health Survey (SF-36 v2).

Results: The sample included 41 male patients, with the mean age of 58,44 ($\pm 10,31$) years. All patients were sexually active. 80,5% were admitted after an Acute Coronary Syndrome, 9,75% after an elective Percutaneous Coronary Intervention and 9,75% after Coronary Artery Bypass Graft. Regarding cardiovascular risk factors, 78% had dyslipidemia, 65,9% had hypertension, 48,8% currently smoked, 43,9% had BMI > 25 kg/m², 26,8% had Diabetes Mellitus type 2 and only 19,5% had family history of CVD. Most patients (85,4%) were taking beta blockers. In the beginning of the CRP 73,2% of the patients had ED while in the end of the program, this percentage decreased significantly to 63,4% ($p < 0,001$). However, there was no significant improvement in IIEF scores (16,54 vs 16,17; $p = 0,593$) at the end of CRP. Functional capacity improved significantly during CRP (9,19 vs 10,59 METs; $p < 0,001$) but it was not associated with an improvement in IIEF scores ($p = 0,174$). In a multivariate regression analysis, age ($p = 0,041$), diabetes mellitus ($p = 0,011$), hypertension ($p = 0,001$), dyslipidemia ($p = 0,034$) and a low score on the mental component of SF-36 v2 ($p = 0,02$) were identified as independent positive predictors of having ED at the end of CRP.

Conclusions: ED was present in over half of the patients undergoing CRP. Unlike the functional capacity, ED did not improve significantly during CRP. Determinants of ED after CRP are mostly related to age, diabetes mellitus, hypertension, dyslipidemia and a low mental component score in SF-36 v2. This study shows that cardiovascular risk factors modification and identification of patients with high levels of stress, are crucial in order to implement strategies to improve sexual health of patients who have suffered an acute cardiovascular event.

Key words: cardiac rehabilitation; cardiovascular disease; erectile dysfunction; sexual health

**REHABILITATION OF PATIENTS WITH PERIPHERAL OCCLUSIVE ARTERIAL DISEASE -
OUR EXPERIENCE**

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Introduction: Rehabilitation of patients with peripheral occlusive arterial disease (POAD) includes a functional assessment of peripheral arteries of the extremities and physical therapy. The goal of treatment is to reduce the subjective symptoms and improvement of objective function parameters (ankle-brachial index-ABI and distance of walk). Therapeutic exercises are obligatory part of treatment protocol, and vacuum-compressive therapy (VCT) has great significance as mechanical therapeutic agent in which the application of pressure and subpressure acting on the extremities. The aim of this paper is to present the effects of physical treatment in patients with POAD in stage II; Fontaine scale.

Materials and methods: Prospective study included 22 patients, average age of 68, among them there were 12 males and 10 women. All participants were in - patients in the Institute for the Physical Medicine and Rehabilitation „Dr Miroslav Zotovic“ in Banjaluka in 2012. The study followed the efficacy of the physical therapy (therapeutic exercises, VCT, current therapy) by measuring the distance of walk and ABI, prior and after the applied therapy. VCT was applied on lower limbs, with two types of parameters, depending on arterial pulsations – if palpable, the VCT parameters were (-35mmHg / 30sec, +30mmHg / 35sec) – if palpations weak or absent , the VCT parameters were (-50mmHg / 35sec, +25 /15sec). Duration of VCT session was 20 min. Student's t - test was used for data analysis.

Results: After 15 VCT treatments, which are used as part of the complex therapeutic protocol, during the period of one month, there was an increase in the initial and maximal distance of walk and there was a very statistically significant difference ($p=0.006$ and $p=0,007$ i.e. $p<0.01$) in values prior and after therapy. After 15 VCT treatments there was an increase in ABI value and there was a extremely statistically significant difference ($p<0.0001$) in values prior and after therapy.

Conclusions: The application of physical therapy may shorten hospitalisation, extend the life expectancy and working ability and lower the complication rate, but requires further research in this area.

Key words: Rehabilitation, POAD

IMPORTANCE OF PRIMARY PROPHYLAXIS OF VENOUS THROMBOEMBOLISM IN SURGERY OF HIP AND KNEE

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Introduction: Orthopedic surgeries such as hip and knee arthroplasty, treatment of fractures et al, lead to high risk (40% - 60%) of the occurrence of venous thromboembolism (VTE). Timely prophylaxis, however, reduces the risk for 10% up to 30%. Because of high incidence of VTE complications in orthopedic surgery, it is required to apply appropriate prophylaxis in order to reduce the risk to a minimum. This paper is aimed at showing the incidence of VTE in patients operated from the hip and knee as well at the importance of primary prophylaxis.

Materials and methods: The study of 100 patients, who were hospitalized at the Clinic for Orthopedic Surgery and Traumatology at the Clinical Centre in Belgrade, was carried out from 2009 to 2012. The subjects of the study had surgery of the hip and knee, 50 of them in the knee region, while 50 patients had surgery in the hip region. Postoperatively, the patients received *heparin*, low molecular weight, and some of them used an elastic bandage (elastic stockings). Out of the total of 100 operated patients, 74 were female and 26 male. Their average age was 68 years.

Results: Elastic stockings, as a form of mechanical prophylaxis, was used only by 6.7% of patients operated of the hip, and 14.5% of patients operated of the knee (Chi-square = 1.569, $p = 0.177$). Primary pharmacological prophylaxis was correctly dosed (per kg / BWT) in the 26.8% of patients operated of the hip, and in 39.0% of patients operated of the knee (Chi-square = 1.032, $p = 0.207$). Out of the 50 patients operated of the knee, 2 of them developed a deep vein thrombosis (DVT), while 48 were without DVT. Out of the 50 patients operated of the hip, 2 developed DVT, and 48 remained without this complication (chi-square = 0.021, $p = 0.884$). After knee surgery, 3 patients had pulmonary embolism (EP), while 47 were without this complication. After hip surgery, 2 patients had EP and 48 were without this complication (chi-square = 0.176, $p = 0.674$).

Conclusions: By applying recommendations for diagnosis and treatment of acute and chronic venous disease we can reduce high risk of VTE in patients operated of the hip and knee.

Key words: venous thromboembolism, orthopedic surgery, primary prophylaxis

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RIGHT FOOT BIG TOE AND LYMPHEDEMA

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Introduction: Researches of the connection between diseases of the right foot big toe and lymphedema are necessary in everyday practice for the orientation and possible prognosis and therapy.

Materials and methods: The pilot study was based on a sample of 30 teachers of our school who were submitted to the investigation of the right foot big toe and lymphedema according to the National Guide for vein diseases and lymphedema

Results: In all examined cases, both lymphedema and the changes on the right foot big toe were found. There is a statistically significant dependence between the patients with lymphedemas above the ankle and lymphedema consistence of $p = 0.96$ $p < 0.05$. The Student T test was applied in investigating the relation between the age and the change frequency.

Conclusion : lymphedema occurring once in a month or more frequently was found in significantly older population.

Key words: lymphedema, changes on the big toe of the right foot

**EFFECTIVENESS OF SUPERVISED - PHYSICAL ACTIVITY INTERVENTIONS ON
CANCER - RELATED FATIGUE IN CANCER SURVIVORS
A SYSTEMATIC REVIEW AND META - ANALYSIS**

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Introduction: Cancer-related fatigue (CRF) is a common problem reported by cancer patients with prevalence rates ranging from 80% to 100%; highlighting that numerous patients continue to experience fatigue symptoms for months or years after successful treatment. The etiology of CRF is multifactorial and presents an important variability among patients; however, it has been associated with emotional disturbances, some pharmacological treatments, nutritional imbalances, sleep disturbances and low levels of physical activity. Epidemiologic evidence suggests that the regular practice of physical activity can reduce the risk of developing cancer. The International agency for research on cancer (IARC) estimates that almost 25% of cancer diagnosis worldwide can be attributed to overweight, obesity and sedentary lifestyles. Additionally, physical activity has demonstrated significant improvements on the deleterious consequences of cancer, such as functioning impairment, fatigue, pain perception, and others. The more recent Cochrane systematic review, which searched clinical trials up to March 2011, reported that aerobic exercise can be considered as a beneficial intervention for individuals with cancer-related fatigue and encouraged further research in this field. The present systematic review aims to update research in this field by including studies published more recently in order to determine the effectiveness of supervised physical activity interventions on cancer-related fatigue in cancer survivors.

Materials and methods: This systematic review and meta-analysis was conducted according to PRISMA statement (<http://www.prisma-statement.org/>). The databases Pubmed/MEDLINE, CINAHL, EMBASE, Sports Discus, PsycINFO and the Cochrane Central Register of Controlled Trials (CENTRAL) were searched through March 1, 2013. The search strategy using boolean operators was as follow: *[(cancer OR cancer survivors) AND (physical activity OR exercise OR physical exercise) AND (cancer related fatigue OR fatigue OR fatigue symptoms)]*. Only clinical trials were accepted for inclusion. Physical activity interventions, such as aerobic exercise, flexibility and resistance training were admitted for inclusion regardless of training intensity. The primary outcome considered in this review was cancer-related fatigue symptoms measured through valid and reliable scales. The Physiotherapy Evidence Database (PEDro) scale was used for the assessment of risk of bias for the selected studies. For meta-analysis procedures, the I² statistic test was used for the assessment of heterogeneity considering the existence of heterogeneity for a value greater than 50%.

Results: After the application of eligibility criteria to the primary search strategy results, we identified 12 studies for inclusion [*k*=12 (100%)] with a sample size (*n*=1689[100%]) and 55.0±7.1 years old. The studies were published in a mean date of 2007.2±3.3 and with a risk of bias score of 6.5±1.0. Breast cancer was the most common diagnosis [*k*=6 (50%)], followed by prostate cancer [*k*=2 (16.6%)]. Moderate intensity aerobic training was the most employed intervention (70%). The cumulative evidence showed that supervised physical activity intervention reduce Cancer-related fatigue (SMD= -0.33 (95%IC) [-0.54, -0.11]). A high heterogeneity was found (I²=71%; *P*= 0,0003).

Conclusions: The result of this meta-analysis indicated that supervised-physical activity

interventions can help to reduce cancer-related fatigue among cancer survivors. However,

current evidence is not enough to demonstrate what is the best physical activity training protocol

to reduce cancer-related fatigue. Further research is suggested.

Key words: Physical activity, cancer, fatigue

EXERCISE PRESCRIPTION IN DIFFERENT COMORBIDITIES

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Introduction: The evidence shows that regular physical activity provides substantial beneficial effects on health. Despite this evidence, the physical exercise program should be adapted to different comorbidities such as arthritis, diabetes, hypertension, obesity, osteoporosis, peripheral artery disease, pulmonary disease, among others.

Materials and methods: Research in PubMed database through the Mesh terms of scientific articles of the past 10 years.

Results: There is clinical evidence of an inverse relationship between physical activity and cardiovascular disease, osteoporosis, diabetes, obesity, cancer, anxiety, depression. Physical activity is recommended as first-line approach in the prevention of various diseases, as well as the first-line therapy of multiple comorbidities. A training program will be more successful if it is prescribed taking into account the person as a bio-psycho-social unique and adapted to comorbidities of the patient.

Conclusions: The prescription must obey the method PRO-FITT (Frequency, Intensity, Time, Type) in order to be a prescription methodical, measurable and specific to the patient and his comorbidities.

Key words: exercise, arthritis, diabetes, hypertension, pulmonary disease

LOW BACK PAIN IN SHWANNOMA – CASE REPORT

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Introduction: Lower back is very common and one of the most frequent reasons to refer patients to physiatrists. Although most cases are due to mechanical syndromes, it is common for oncologic patients to develop metastasis in the vertebral column. Primary tumors of the spinal cord on the other hand are relatively rare. Shwannomas are benign slow-growing tumors which derive from Schwann cells, the most important glia of the peripheral nervous system. These cells are normally found surrounding peripheral nerves in order to form myelin insulation sheaths.

Materials and methods: We report the case of a 61-year old female patient who presented two years of persistent lower back pain. The characteristics of the pain and previous imaging exams were compatible with a mechanical cause. After assessment a rehabilitation plan was implemented. The patient referred relief of lumbar pain in the follow-up consultation, however the physical exam detected hypoesthesia between D₇₋₈ and S₂, increased lower limb tendon reflexes, MRC grade 4 muscle strength and bradykinetic gait with slight claudication. An overactive bladder and constipation were also present, nonetheless, attributed to a rectocele. Emergency MRI-scan detected a paravertebral solid mass between D4 and D7 with infiltration into the vertebral canal through the intervertebral foramen and subsequent compression of the spinal medulla particularly between D5 and D6 as well as type II modic changes. Consequently the patient was admitted for surgery, the tumor was removed through a joint collaboration between both the Cardiothoracic and Neurosurgical teams and the surgical specimen was sent for histological analysis. Post-operative spinal MRI was done. A post-operative rehabilitation plan was put into action.

Results: Post-operative MRI-scan showed residual tumor on the right anterior lateral portion of the spinal medulla and significant muscle inflammation. Histological examination of the surgical specimen identified the tumor as a probable Schwannoma, not excluding nonetheless the possibility of being a hemangioblastoma. There was no evidence of malignancy. Treatments prior to the operation lead to some pain relief. Post-surgical rehabilitation has been positive with pain reduction, improved gait, increased muscle strength and regained ADL independence.

Conclusions: This is a case in which previous comorbidities masked the presence of a non-mechanical cause of the symptoms. This case demonstrates the importance of being aware of the differential diagnosis of lower back pain when presented with atypical clinical evolution during rehabilitation.

Key words: hemangioblastoma, schwannoma

**SPONTANEOUS SPINAL EPIDURAL HEMATOMA IN HEMODIALYSIS PATIENTS: THE RISK
BENEFIT OF ANTICOAGULATION**

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Introduction: Spontaneous spinal epidural hematoma (SSEH) is a rare neurosurgical emergency, where blood accumulates in the spinal epidural space spontaneously without obvious traumatic or iatrogenic cause. Although patients with SSEH may have spontaneous recovery, the typical outcomes include paraplegia, quadriplegia and even death. For most patients early diagnosis and decompression are recommended to prevent mortality and morbidity. Several factors have been associated with the outcomes, but controversy remains because of its rarity. Although the etiology of SSEH remains unclear, there have been reports of contributing factors including vascular malformation, reduced platelet count disorders, thrombolytic therapy, anticoagulation, leukemia, hemophilia, hypertension, pregnancy and minor trauma.

The use of anticoagulation in the treatment and prophylaxis of a variety of medical disorders has been long established but the known risk of bleeding while on treatment can't be ignored.

SSEH has been described in a variety of clinical scenarios, including chronic renal failure. Here, the risk benefit of anticoagulation must be weighed, particularly in severe renal impairment. End stage renal disease patients have a high risk for the development of hemorrhage because of anticoagulants administration during dialysis, hypertension, uremic bleeding disorder and intracranial pressure fluctuations during hemodialysis.

Materials and methods: The authors conducted a literature review in the context of a clinical case. They searched on PUBMED and COCHRANE databases using the keywords "chronic renal failure", "low molecular weight heparin" and "spontaneous spinal hematoma" to identify studies that focused on SSEH in patients with chronic renal failure in hemodialysis and try to understand the underlying mechanism.

Results: There are few reports of spontaneous spinal epidural hematoma in hemodialysis patients and the etiology is still unclear. Nevertheless we know that enoxaparin is renally eliminated so there are recommendations for dose adjustment in patients with severe renal impairment (creatinine clearance <30 mL/minute), which must imperatively be applied so as to minimize their potential risks. Observations from clinical trials that utilized standard enoxaparin dosing and included patients with severe renal impairment noted an increased incidence of major bleeding.

Conclusions: Spontaneous spinal epidural hematoma, although rare, alerts us to the possibility of complications related to anticoagulation, and even when controlled, is not without risk with potentially catastrophic consequences. Patients with severe renal impairment are a challenge and given the problems in predicting or monitoring the effects of enoxaparin in these patients, we wonder if it can be used for prophylactic or systemic anti-coagulation in this population of patients with reasonable safety.

Key words: chronic renal failure, spontaneous spinal epidural hematoma, low molecular weight heparin

OSTEOGENESIS IMPERFECTA: CASE REPORT

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Introduction: Osteogenesis imperfecta (OI) includes a heterogeneous group of genetic disorders characterized by an increase in skeletal fragility, a decrease in bone mass and a susceptibility to bone fractures of different entity. The prevalence is 1/10.000 - 1/20.000, earlier is the onset severer is the disease. People with severe forms may undergo hundred of fractures throughout their life and numerous other complications. In 95% of cases, OI is due to mutations of the genes COL1A1 and COL1A2 (COL1A1 is located on chromosome 17 and COL1A2 on chromosome 7, at position 17q21.33 and 7q21.3). COL1A1 and COL1A2 encode for Alpha1 and Alpha2 chain of type I collagen respectively. Mutations in those genes are responsible for all five type of OI. It is usually an autosomal dominant disease, nevertheless autosomal recessive forms of OI have also been described, which are linked to mutations in LEPRE1, CRTAP and PPIB genes (1p34.1, 3p22 and 15q21-q22). Autosomal recessive forms are more severe when they are associated with severe hypotonia.

Case report: Three siblings with family history of multiple fragility fractures have been followed in our Physical Medicine and Rehabilitation Department for the past six months.

The older sister of 25 y.o. has been experiencing fragility fractures since she was nine months, at that time she fractured a finger of her right hand. Successively she underwent fractures at the right clavicle (4 years), right radius (three months after), wrist and left radius (10 years). At the age of 16 she underwent surgery for correction of the left flat foot. DEXA examination showed no spinal deformities, the X-Ray of dorsal and lumbosacral spine showed no vertebral fractures. The brother of 14 has reported the fracture of D9 at 6 years old, accidentally caused by a fall off a chair; when he was 7 he fractured L2; at 9 years of age he fractured the right wrist; when he was 11 he fractured his left wrist and the 1st phalanx of the right toe. Morphometric examination by DEXA highlighted multiple vertebral deformities (T4, T5, T6, T7, T8, T9 and L1). The X-Ray of spine + pelvis under load showed modest dorsal left-convex scoliosis together with structural alterations of dorsal vertebral bodies with reduced thickness. Basin is in axis. Dorsal kyphosis and lumbar lordosis are accentuated.

The younger sister was 11. She presented several fractures since her childhood as well. The first trauma was at left proximal radius at 5 years old. Subsequently she reported the fracture of the left wrist (5 and 9 years) and of the left olecranon (10 years). The X-Ray of spine + pelvis under load showed modest right-convex lumbar scoliosis together with morphological alterations of the wedge-shaped body of L2. Basin in axis. Adjusting amplitude of the physiological curves of the spine. The X-Ray lumbosacral spine: modest right-convex lumbar scoliosis. Basin in axis. Adjusting amplitude of the physiological curves of the spine.

According to clinical, laboratory and instrumental profiles, we believe is necessary to further investigate the genetic profile of all three siblings. We aim to identify possible mutations of genes linked to OI. Molecular analysis are still in progress. Preliminary results for gene sequencing were negative for the gene COL1A in all three siblings.

Key words: Osteogenesis imperfecta, fractures fragility, genetic mutations

IS A DISTRIBUTION OF EARLY REHABILITATION MODALITIES IN PATIENTS AFTER ACUTE ABDOMINAL OPERATIONS IN CORREALTION WITH SURGICAL INTERVENTION SEVERITY?

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Introduction: Early rehabilitation is carried out in the early period after injury, illness or immediately after surgery and when the patients general condition allows it.

The aim of our study was to evaluate the presence of early rehabilitation procedures and the length of their duration in patients after abdominal surgery for better planning of resources in relation to the individual patients needs for rehabilitation.

Material and Methods: We analyzed the presence of performed physical therapy procedures in patients operated from acute surgical diseases and conditions: the gall bladder (30 patients), appendicitis (40 patients) and patients who undergone resection of the stomach (30 patients). Testing was conducted on a surgical ward of Emergency Center at Clinical Center of Serbia, during last 6 months of 2012 year. The physical therapy modalities were divided into three groups: Group1-respiratory rehabilitation (inhalation, forced expiratory flow exercise, drainage percussion), Group 2-verticalization (sitting, standing, walking), Group 3-kinesiotherapy (passive, active-assisted and active exercises, exercises for peripheral circulation, static exercises for quadriceps and gluteal muscles). Distribution in relation to the length of hospitalization (days) and the type of surgery was followed.

Results: In almost every third patient (36.7%) with cholecystectomy, every fifth (17.5%) with an appendectomy, and in more than two-thirds of patients (70%) with gastrectomy respiratory rehabilitation was performed. All patients were included in verticalization program. It is shown that verticalization was significantly more frequently applied versus respiratory rehabilitation ($p < 0.05$). For all investigated pathological conditions it has been shown that active exercises were significantly more frequently applied, followed by active-assisted exercises, while passive exercises were conducted the least frequently ($p < 0.05$). Physical therapy was performed significantly longer in patients with gastrectomy (6.14 ± 1.29), followed by those who underwent cholecystectomy (3.27 ± 1.14). The shortest duration of physical therapy was for patients who underwent appendectomy (2.31 ± 0.97). It is shown that there is statistically significant difference in duration of the rehabilitation program in relation to the type of disease or conditions ($p < 0.05$).

Conclusion: Individual approach to every patient concerning planning and implementation of early rehabilitation program, as well as teamwork which is composed of different specialties physicians, therapists, nurses, is necessary condition for the successful recovery of the patient. Our results showed that the severity of surgery requires complex physical therapy for the recovery of patients and longer duration of rehabilitation. These results stress out better planning and allocation of human resources in relation to the type of surgical procedure.

Key words: Early rehabilitation, cholecystectomy, appendectomy, gastrectomy

**FEEDING INDEPENDENCE AND SPEECH AND LANGUAGE DISORDERS IN
NEUROLOGICAL HIGH-RISK CHILDREN**

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Introduction: Children who are in the antenatal, perinatal, or postnatal period exposed to the effects of risk factors are classified as neurological high-risk children. These children often have psychomotor development disorders. Among other problems, they may have feeding difficulties and delays in speech and language development. These two functions are interconnected through oral motor skills that are essential for eating processes as well as for speaking skills and the ability of expression.

Materials and methods: The paper analyzes ways of feeding and speech and language status with chronological age of the neurological high-risk children involved in the habilitation treatment. The sample consisted of 107 children involved in the habilitation treatment at Institute for the Physical Medicine and Rehabilitation "Dr Miroslav Zotović" Banja Luka.

Results: Average age for this sample was 3,21 years, with a range from 2 to 5.5 years. The sex ratio was 59.8: 40.2 in favor of males. At the liquid diet was 9.3%, mashed 50.5% and normal 40.2% of the sample. Via nasogastric tube fed 2.8%, through bottle 12.1%, and with a spoon over 85% of the sample. Regarding feeding independence, 22.4% children from this sample were independent in feeding, 45.8% were partly independent and 31.8% were dependent on others. Average age of the children that were at the liquid diet was 3.13, mashed 3.08 and normal 3.40 years. The sample consisted of 35.5% immobile children, 20.6% children that needed the help of another person or aids and 43.9% independently mobile children. 75.7% of the sample had some kind of speech and language impairment, 18.7% of the sample had no speech and language difficulties. For six children, speech and language status was unknown. Of 81 children who had speech and language difficulties, 49 was at liquid and mashed diet which shows a deficit of oral praxis in this group of children. There is a correlation of medium level between feeding types and speech and language status in neurological high-risk children ($r=0,533$). In the group of children that had speech and language impairment, 10 were fed through bottle, 68 with spoon and 3 via nasogastric tube. There is a high correlation between feeding ways and speech and language status in neurological high-risk children ($r=0,736$).

Conclusions: The largest number of neurological high-risk children are at liquid and mashed diet, although the average age of the sample is 3.21 years, which shows the problems of delay in the development of oral motor skills. Most of the sample has speech and language disorders. There is a correlation between types and ways of feeding and speech and language status.

Key words: oral motor skills, feeding difficulties, speech and language disorders

ASSESMET OF THE VALIDITY OF THE JUVENILE ARTHRITIS FUNCTIONALITY SCALE ON CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS IN SERBIA

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Introduction: The physical function is very important component in clinical evaluation of the activity of juvenile idiopathic arthritis (JIA). The most widely used questionnaire for functional assessment is the Childhood Health Assessment Questionnaire (CHAQ), which main disadvantage is its length (69 questions) and its lesser applicability for the children of younger age due to its complexity. The aim of the study was to assess validity of the new, short and simple questionnaire -The Juvenile Arthritis Functionality Scale (JAFS) on the children with JIA.

Materials and methods: The study included 80 consecutive children treated in the Institute of Rheumatology from January 2010 till April 2011, all diagnosed JIA, 56 (70%) girls and 24 (30%) boys, mean age 10.17 ± 4.91 years, disease duration 3.68 ± 3.19 years. Construct validity of JAFS questionnaire was tested by comparison with CHAQ, and core set variables of disease activity (laboratory indices, articular indices, parent's and children's assessments of overall wellbeing and pain, and the physician assessment of disease activity). It was predicted that correlation of the two functional status measures will be strong, and the correlation with other JIA activity measures will be moderate to weak. Also, the ability of the JAFS questionnaire to recognize different degrees of disability among patients based on Steinbrocker's functional class criteria was tested. Spearman correlation coefficient (r), Interclass correlation coefficient (ICC), Kruskal-Wallis test and χ^2 test were used for statistical analysis.

Results: Correlation of both JAFS I CHAQ questionnaires with other JIA activity measures is statistically highly significant ($p < 0,01$), and for all variables it is higher for JAFS than for CHAQ. Correlation of two questionnaires is high ($r = 0,846$ for parents; $r = 0,898$ for children), while the correlation of questionnaires with other JIA activity measures is moderate to low ($r < 0,7$), and corresponds to predicted correlation. The level of concordance between parents and children are high for both questionnaires (ICC 0,81 for JAFS; ICC 0,87 for CHAQ). There is statistically significant difference of total JAFS score and JAFS subscale scores for lower limbs and hand/wrist, among patients belonging to different functional classes according to Steinbrocker's functional class ($\chi^2 8,427$; $\chi^2 8,774$; $\chi^2 10,787$ $p < 0,05$).

Conclusions: JAFS questionnaire shows equally good, even better, construct validity compared to CHAQ on the patients with JIA, it has good discriminative ability, so it can be considered as adequate tool for assessment of functional status of children with JIA.

Key words: juvenile idiopathic arthritis, functional assessment

IMPORTANCE OF THE POSTURE IN CHILDREN WITH NEUROLOGICAL DYSPHAGIA

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Introduction: Children with neurological disabilities may have an increased risk of swallowing disorders – (dysphagia: *JC Arvidson, 2008*). A particular attention must be given to postural seating systems for inadequate devices for postural control can aggravate dysphagia and also the typical co morbidities frequently occurring in these patients (GERD, reduced thoracic excursion, secondary skeletal deformities). Therefore improving oral motor skills and jaw and head control in these children is essential and it requires a specific training along with a proper postural alignment. The aim of this study is to evaluate the rehabilitative training effectiveness for oral motor abilities when using *ad hoc* seating posture systems in children already undergoing rehabilitation treatment in unfavourable postural conditions. Furthermore to verify how improving posture alignment may reduce care burden-duration of meal time for the caregiver in the home setting.

Materials and methods: 20 patients (average age 6.5 years, range 4-10 years) with neuromotor disorders (GMFCS IV-V) suffering from neurological dysphagia, were assessed by the physiatrist and the speech pathologist, who programmed the rehabilitation assessment that could include the following clinical and instrumental evaluations: digestive surgeon, otolaryngologist, dentist, and orthopaedic technician, videofluoroscopic swallow study (VFSS). If necessary, both seating postural systems and oral motor therapies (20 sessions) were reviewed. At the beginning and at the end of the training, standardized scales have been administered for posture (SPCM, LSS) and for neurological dysphagia (SOMA, NOMS).

Results: The main problems we observed in these children are the inadequate head support, the limited containment and alignment of the trunk and the pelvis, the hip angle flex/ext < 90°, the incorrect positioning of the hip belt, which could affect breathing and increase intra-abdominal pressure. A direct correlation emerged between postural misalignment and dysphagia severity. A correct posture and oral motor therapies have determined an improvement of oral motor skills (as confirmed by the scales SOMA and NOMS). Moreover a reduction of time was observed in the administration of meals - care burden.

Conclusions: A multidisciplinary team approach in children with neurological dysphagia allows to coordinate a global assessment and to take decisions in order to assure an optimal rehabilitative outcome.

Key words: Child, neurological dysphagia, neuromotor disorders, postural alignment

ENTRAPMENT NEUROPATHIES OF THE UPPER AND LOWER EXTREMITIES

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Objective: 1) To describe the common entrapment neuropathies of the upper and lower extremities; and 2) To discuss the role of electrodiagnosis in entrapment neuropathies.

Definition: Entrapment neuropathy is injury of the peripheral nerve by compression along its course by body structures. It usually occurs through a fibrous or osseofibrous tunnel or at a point where the nerve abruptly changes its course through deep fascia over a fibrous or muscular band. Common examples at the upper limbs: Carpal tunnel syndrome (CTS), ulnar entrapment (at the wrist or elbow), proximal median neuropathy, thoracic outlet syndrome (TOS), suprascapular nerve entrapment, radial nerve entrapment, posterior interosseous nerve entrapment and musculocutaneous nerve entrapment.

Common examples at the lower limbs: Common peroneal nerve entrapment (at neck fibula), tarsal tunnel syndrome (TTS), anterior TTS, neuralgia paresthetica, femoral nerve entrapment, saphenous nerve syndrome and sciatic neuropathy.

Diagnosis: It is usually made by the clinical manifestations and confirmed by electrodiagnosis (and sometimes by imaging). Clinical findings include pain and paresthesia at area supplied by the involved nerve, weakness of muscles supplied by the affected nerve distal to the site of entrapment and positive confirmatory tests (tinel's sign or Phalen test).

Role of electrodiagnosis: Electrodiagnosis can localize the site of entrapment, reveal the type of nerve pathology (neurapraxia or axonotemesis) and assess the extent of the lesion (partial or complete).

The commonly used electrodiagnostic procedures: Nerve conduction studies (motor and/or sensory), sensory comparative studies (for very mild CTS), F wave and H reflex (for TOS and sciatic neuropathy) and electromyography (to detect signs of denervation at muscles supplied by the affected nerve distal to the site of entrapment) are usually used. Somatosensory evoked potential may be needed to differentiate entrapment neuropathy from nerve root lesion. The appropriate electrodiagnostic procedure is chosen according to the nerve to be examined and the expected site for entrapment.

The expected electrodiagnostic findings: Slow nerve conduction across (or distal to) site of entrapment (including prolonged distal latencies in entrapment of the distal part of the nerve), decreased CMAP amplitude, decreased SNAP amplitude, unobtainable nerve conduction (in severe entrapment) and electromyographic signs of denervation at muscle supplied by the affected nerve.

W – 05 / W – 10

ONE DAY MUSCULOSKELETAL SONOGRAPHY COURSE

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Objectives:

- Learning the technical characteristics and setting of ultrasound equipments for MSK examinations.
- Learning the systematic standardized sonographic scanning method of each anatomical region of the knee and hip, according to the EULAR guidelines.
- Stressing on the importance of sonography for the early diagnostics of knee and hip pathology.
- Learning the technique of intraarticular injections under the control of ultrasound.

Methods:

Course will be a combination of lectures and practical sessions, consisting of theoretical talks and supervised hands-on scanning of healthy persons and/or patients with musculoskeletal disorders.

PROGRAM:

Lecture: Approach to the patient and the machine - Practical handling of the ultrasound machine settings

Lecture: Normal sonographic findings – knee

Lecture: Basic pathological sonographic findings – knee

Lecture: Normal sonographic findings – hip

Lecture: Basic pathological sonographic findings – hip

Lecture: Injections under the sonographic quidenance

INTRATHECAL BACLOFEN THERAPY FOR TREATMENT OF CNS SPASTICITY

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Introduction: In some patients severe spasticity of cerebral or spinal origin can not be treated successfully with conventional oral medication or physical modalities. Intrathecal baclofen therapy with implanted pump represents effective treatment from mid-80's. Baclofen (Lioresal) is a muscle relaxant and potent GABA agonist that acts via GABAB receptors at the posterior columns of spinal cord level, to inhibit the release of excitatory neurotransmitters by inhibiting calcium ions influx into presynaptic terminals. This direct binding on spinal cord receptors leads to higher efficiency compared to peroral therapy in which baclofen does not pass the brain-blood barrier. Intrathecal Baclofen Therapy (ITB) involves the long term delivery of Baclofen to the intrathecal space surrounding the spinal cord for the purposes of relieving severe spasticity. This delivery method of Baclofen is used when oral medication or conventional physical therapy no longer manages the spasticity sufficiently, and the spasticity has an impact on the quality of life of the patient.

The benefits of ITB to the patient are well documented, and typically reduce muscle spasms, tone and pain. This in turn increases mobility, independence, stamina, sleep and an overall increased quality of life. In addition to the patient benefits, there is also a reduced workload for care by patient caregivers and family members.

Since ITB therapy, as a part of broader neuromodulation therapy, is regarded as functional treatment, interdisciplinary approach is necessary for building a successful center and achieving a long term therapeutic goals. As rehabilitation medicine specialist is only holistic oriented specialist, with knowledge of functional assessment, it is recommended that therapeutic process is coordinated by the PRM specialist.

Key words: Intrathecal baclofen pump, spasticity, central nervous system lesion, rehabilitation

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