L001

FUNCTIONAL ELECTRICAL STIMULATION IN POST-STROKE PARALYTIC HAND

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Paralysis of hand and upper limb after vascular or traumatic brain insult is one of the most dramatic situations provoking motor impairment and functional disability. Beyond that, is a source of despair and loss of self-image in these patients. Functional electrical stimulation (FES) is an advanced and innovative technology that may provide some solutions in the realm of the rehabilitation efforts to improve paralytic hand functioning. Although the concept is not new, modern technology provides better means to achieve enhanced results in different clinical aspects.

The NESS-Handmaster is a hybrid neuro-orthosis that provides support to the paralytic hand and allows for personally fitted electrical stimulation programs. The device is portable and can be safely used by the patients at home.

The device's efficiency was tested in two groups of patients: one with complete paralysis and an additional one with partial paralysis, both with a control group.

The groups were similar in age average (57.3 vs. 54.1 years) and time since stroke (3.6 months after stroke). Thus, the groups were at a sub-acute stage when most of the expected spontaneous changes already occurred. All patients were attending the day hospital at Loewenstein by the time of the study.

After initial fitting by the professional team, both groups were given a 5 weeks home training program consisting on a daily and gradually increasing functional electrical stimulation time, starting at 10 minutes twice a day and progressing to 45 minutes three times a day. No adverse effects were observed.

Outcome measures were: the modified Ashworth scale for measuring spasticity, active motion (flexion, extension – by joints) and functional testing: box & blocks and the Jebsen-Taylor timed objects lifting test.

The study group had improved spasticity reduction in complete paralysis and facilitation of increased voluntary motion both distal and proximal and greater and more consistent improvement in functional and timed hand tests in the paresis group.

The main conclusions of the study are that the device can be efficiently integrated in into treatment in sub-acute stroke rehabilitation and that baseline status, namely paralysis/paresis can be used to predict the nature of improvement to expect.

The mechanisms behind improvement may be of different nature: reciprocal and recurrent inhibition in spasticity reduction, facilitation mechanisms such as activation of the motor and sensory gamma systems, decreasing inhibition of anterior horn cells of antagonist spastic muscles, increased cortical representation, "unmasking" long-term potentiation of synaptic transmissions and undo of "learned non-use".

L002

FUNCTIONAL ELECTRICAL STIMULATION

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The purpose of FES is to provoke contraction of muscles deprived of nervous control, in order to obtain a useful functional movement. This distinguish it from a therapeutic electrical stimulation which can be used to improve muscle strength or for some other purposes.

FES can be used to regulate functioning of heart, breathing and coughing, to improve urine incontinence and mainly to improve functions of human extremities – standing, walking and function of upper extremity such as grasp and release of objects.

Lesion that has resulted in deprived nervous control of muscles can be in brain, spinal cord or peripheral nerve, but only in the first two FES can be used. The prerequisite for FES is preserved excitability of the lower motoneuron and muscle that is able to contract. Consequently, FES is primarily used in the rehabilitation after upper motor neuron lesion or in patient with hemiplegia due to stroke or SAH, para or quadriplegia, cerebral palsy, MS and head trauma.

FES can be used as a therapeutic method during rehabilitation or also as an orthotic aid after the discharge.

For FES we need stimulator, electrodes and the control mechanism. Electrical stimulators generate electrical current. They can provide or a constant voltage or constant current output. Stimulators providing a constant output voltage can maintain a voltage desired irrespective of resistance changes, whereas stimulators with current output make possible constant current pulse. They can be or single, double or multichannel. They have to have possibility to change parameters of electrical stimulation, such as stimulation pulses amplitude, frequency of stimulation pulses, duration of stimulation pulses and the stimulation pulse train. All these parameters have to be selected and adjusted by a skilled therapist.

A functional movement of a paralyzed extremity cannot be obtained by a single electric stimulus but a series of stimuli called a stimulation pulse train. It is triggered by a control signal.

The control of FES system is one of the most critical problems. For standing and walking it can be triggered by a switch on a crutch or heel switch. Greater problems are appropriate control systems for controlling FES for upper extremities.

Electrodes are a direct contact between a stimulator and a patient. They can be surface or implanted and unipolar or bipolar. We have to choose the right size and select the optimal position to achieve a maximal effect.

FES is increasingly used in neurorehabilitation to improve mobility and upper limb functions. The most common use is for the correction of dropped foot in a hemiplegic gait. Recently, upper limb FES applications in hemiplegia have started and have demonstrated clinical value. Strokes can affect different parts of the brain, and cause different symptoms. Many muscles in the face, leg or arm may be paralyzed. Some functions of stroke patients gradually return, but often the muscles remain weak and are difficult to coordinate. One of the possibilities to achieve standing and improvement of locomotion in complete or incomplete spinal cord injury patients is the use of Functional Electrical Stimulation (FES). The method can be used as a short-term therapeutic treatment in the clinical environment or as a permanent orthotic aid.

Neurotherapeutic treatment of cerebral palsy children is of the utmost importance to the restoration of their motor abilities and prevention of subsequent deformities. Programmed, often repeated patterns of motor responses, which in the child can be evoked by FES, result in additional facilitation of motor responses.

L003

CRANIAL NERVE TESTING IN AN EMG LABORATORY

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Stimulation of the Facial Nerve

The test of nerve excitability consists of applying shocks of increasing intensity and observing the resulting contraction of the facial muscles. The normal threshold ranges from 3.0 to 8.0 mA,

depending on skin resistance, skin temperature, and the anatomic course of the facial nerve. Comparisons with the unaffected nerve on the opposite side reduce the number of variables to a minimum. In healthy subjects, differences between left and right should not exceed 2.0 mA. A complete section of the nerve at a proximal site results in loss of distal excitability by the end of the first week, but not during the first few days before the emergence of wallerian degeneration. Hence, a normal distal response at the end of the first week after onset suggests a good prognosis for recover.

Recording of muscle action potentials provides a more quantitative assessment of nerve excitability than visual inspection of contracting muscle. Stimulating the facial nerve just below the ear and anterior to the mastoid process or directly over the stylomastoid foramen elicits compound muscle action potentials in the facial muscles. Placing the stimulating electrodes more distally along a branch of the facial nerve results in more selective activation of the target muscles. Its designation as direct response, or M response distinguishes it from the reflex activation of the orbicularis oculi by stimulation of the trigeminal nerve. The amplitude of the direct response varies with the number of functional motor axons, whereas the onset latency reveals the distal conduction of the fastest fibers. Recording electrodes consist of G1 placed on the orbicularis oculi, orbicularis oris, quadratus labii, or nasalis, and G2 on the same muscle on the opposite side or on the nose. When necessary, selective stimulation of a given branch of the facial nerve elicits an isolated response from any of the muscles of the face, including the posterior auricular muscle. Some investigators prefer to recording from a needle placed in the orbicularis oris just superior to the corner of the mouth or in the orbicularis oculi at the lateral epicanthus. Surface electrodes are generally better for assessment of compound muscle action potentials, although needle study is useful for selective recording from a small or atrophic muscle. The coaxial needle gives a slightly better endpoint than the monopolar needle used in conjunction with a reference electrode placed on the side of the nose. A larger electrode placed on the forehead or under the chin serves as the ground.

Reported normal values for facial nerve latencies (mean±SD) in adults range from 3.4±0.8 ms to 4.0±0.5 ms. For the assessment of a proximal lesion in Bell's palsy, the latency of the direct response rarely provides useful information. Even with substantial axonal degeneration, the remaining axons tend to show a normal or only slightly increased onset latency. In contrast, the amplitude of the direct response determines the degree of axonal loss for accurate assessment of prognosis. Comparison between the sides in the same individual provides a more sensitive measure than the absolute value, which varies substantially from one subject to the next. An amplitude reduction to one half that of the response on the normal side suggests distal degeneration.

More importantly, serial determinations reveal progressive amplitude changes as an increasing number of axons degenerates in time. Distal stimulation elicits a normal response for a few days, even after complete separation of the nerve at a proximal site. By the end of the first week, however, the amplitude drops abruptly, coincident with the onset of inexcitability of neuromuscular junction followed by nerve degeneration, thus, a normal direct response during the first week after injury promises a good prognosis. With shocks of very high intensity, a stimulating current may inadvertently activate the masseter muscle at its motor point. A volume conducted potential from this muscle can erroneously suggest a favorable prognosis when in fact the facial nerve has already degenerated. Close visual inspection of the contracting muscle clarifies the otherwise confusing results.

Stimulation of the Trigeminal Nerve

Stimulation of the trigeminal nerve elicits reflex contraction of the orbicularis oculi. In contrast to the direct response that provides a measure of distal nerve excitability, the blink reflex reflects the integrity of the afferent and efferent pathways including the proximal segment of the facial nerve. A single shock to the supraorbital nerve evokes two separate contractile responses of the orbicularis oculi. The latency of R1 represents the conduction time along the trigeminal and facial nerves and pontine relay. Inherent latency variability from one trial to the next makes R2 less reliable for diagnostic purposes. Furthermore, the latency of R2 reflects the excitability of interneurons and the delay for synaptic transmission, in addition to the axonal conduction time.

The subject lies supine on a bed in a warm room with the eyes open or gently closed for surface stimulation with the cathode placed over the supraorbital foramen, and the anode placed 2 cm rostrally. Shocks applied here evoke R1 and R2, which are best recorded with two pairs of recording electrodes (G1) and reference (G2) electrodes placed 2 cm apart on the lower aspect of the orbicularis oculi muscle on each side with a ground electrode under the chin or around the arm. Additional studies consist of stimulation of the infraorbital and mental nerve with the cathode placed over the respective foramen on one side and recording from the orbicularis oculi on both sides. Assessment of facial synkinesis requires two pairs of recording electrodes on the same side of the face, one pair over the orbicularis oculi and the other over the orbicularis oris or platysma.

A mechanical tap on one side of the forehead evokes an R1 only ipsilaterally, similar to unilateral electrical stimulation. In contrast, a glabellar tap, stimulating the trigeminal nerves on both sides, elicits the R1 component bilaterally, allowing instantaneous comparison of the two sides. A mechanically elicited R1 has a latency 2-3 ms greater than the electrically evoked response. The longer latency results in part from additional length of the afferent arc from the glabella to the supraorbital foramen, averaging 2 cm. Activation time of the cutaneous receptors probably accounts for the remaining difference. This stands in contrast to magnetic coil stimulation, which also elicits R1 bilaterally, but with latencies equal to those following electrical shocks.

The R2 component elicited by a glabellar tap provides confirmation of an afferent or efferent abnormality of the electrically elicited R2. A glabellar tap s1timulates the right and left trigeminal nerves simultaneously, and these nerves activate the facial nuclei on both sides to elicit bilateral R2 responses. A consistent latency or amplitude difference between simultaneously recorded right- and left-sided R2 indicates a delay or block in the facial nerve that constitutes the final common path. A lesion affecting the afferent arc unilaterally does not alter R2 on either side, because the crossed afferent input from the unaffected side compensates for the loss. A glabellar tap or magnetic coil stimulation renders less discomfort to patients and causes no shock artifacts. In our experience, however, electrical stimulation of the supraorbital nerve generally provides more precise information.

Facial Nerve Lesions

Bell's palsy affects the facial nerve sporadically in an isolated incidence. Although the exact etiology remains unknown accumulating evidence suggests that herpes simplex virus type I (HSV-1) reactivation causes Bell’s palsy in some, but not all patients, giving a rational for antiviral therapy with acyclovir. Swelling and hyperemia in the intraosseous portion of the facial nerve suggests a focal pathology during the acute stage. Paralysis of the upper and lower portions of the face develops suddenly often associated with pain behind the ear. Additional features may include loss of taste in the anterior two thirds of the tongue and hyperacusis on the affected side. At least 80 percent of patients improve quickly without specific therapy. Complete recovery follows the demyelinative form, whereas functions return slowly and poorly after degeneration of the facial nerve. Synkinesis nearly always develops with regeneration. Patients may complain of sensory signs in the trigeminal distribution in an otherwise typical case of Bell's palsy. Patients with a rare familial type may suffer from recurrent episodes, which tend to leave increasing residual weakness after

each attack. Hyperostosis cranialis interna, a rare genetic bone disorder, also causes a recurrent facial palsy associated with impairment of the senses of smell, taste and vision.

The same principles apply to the electromyographic examination of facial and limb muscles. In the face, however, physiologically small motor unit potentials may mimic fibrillation potentials, and signs of denervation appear early in less than 3 weeks following injury presumably because of the short nerve length. Serial electrodiagnostic studies help delineate the course of the illness. The amplitude of the direct response elicited by stimulation of the facial nerve provides the best means for prognosis after the fourth to fifth day of onset. An amplitude greater than one half of the control value on the normal side indicates a good prognosis, although late degeneration can still occur. Preservation or return of Rl or R2 of the blink reflex also serves as a reliable measure in predicting a satisfactory recovery, providing reasonable assurance that the remaining axons will survive. The reflex, however, rarely returns during the first few days after onset. In a series of 56 patients who recovered without distal degeneration, the R1 reappeared by the latter half of the first week in 57 percent, by the second week in 67 percent, and by the third week in 89 percent. Other signs for good outcomes include incomplete clinical paresis and the presence of voluntary motor unit potentials in electromyographic studies.

Peripheral facial paresis secondary to herpes zoster infection carries a less favorable prognosis although early administration of acyclovir and prednisone may reduce the nerve degeneration. Diabetic patients who develop a facial palsy also tend to have a more severe paresis and evidence of substantial denervation. Patients with Guillain-Barre syndrome usually develop prominent facial paresis as the consequence of acute demyelinative conduction block. In contrast the chronic insidious progression in hereditary in Charcot-Marie-Tooth disease Type 1 allows compensation for motor function despite marked delay in conduction, showing minimal weakness.

An acoustic neuroma strategically located at the cerebellopontine angle may compress not only the facial nerve but also the trigeminal nerve and the pons, i.e., the efferent, afferent and central arcs, of the blink reflex. Thus, the electrically elicited blink reflex reveals various degrees of abnormality in a most patients showing a high correlation with the tumor size. Hypoglossal facial nerve anastomosis may partially restore function after sacrifice of the facial nerve for removal of cerebellopontine angle tumors. Sarcoidosis may also involve the facial nerve probably at the cerebellopontine angle.

Peripheral facial palsy may herald other symptoms of multiple sclerosis in young adults. In these cases, blink reflex studies usually show an absent or delayed R1, indicating demyelination of the central reflex arc, which includes the intrapontine portion of the facial nerve. Myokymic discharges, although characteristic of this disorder, may also appear in other conditions such as pontine glioma.

Progressive hemifacial atrophy may develop in scleroderma with or without associated hemiatrophy the body.

Trigeminal Nerve Lesions

Trigeminal sensory neuropathy characteristically evolves with unilateral or bilateral facial numbness sometimes accompanied by pain, paresthesia and disturbed taste. This type of neuropathy may accompany systemic sclerosis or mixed connective tissue disease. Patients with trigeminal neuralgia have altered cutaneous sensation in both the affected and unaffected adjacent divisions, suggesting combined peripheral and central pathology. A mandibular fracture may result in an isolated lesion of the mandibular nerve. Demyelinating lesions affecting pontine trigeminal pathways may cause trigeminal neuralgia in patients with multiple sclerosis. Exposure to trichloroethylene causes a cranial neuropathy with peculiar predilection for trigeminal root damage. Facial numbness may herald other symptoms of an expanding tumor involving the trigeminal nerve. Other causes of trigeminal nerve lesion include perineural spread of carcinoma. The blink reflex helps establish abnormalities of the trigeminal nerve. Other techniques of interest include conduction studies of the trigeminal motor nerve and of the mandibular nerve.

Accessory Nerve Lesions

Pressure from a tumor or surgical procedures of the posterior triangle can damage the spinal accessory nerve. Other causes include stretch induced injury, cargo loading, coronary artery bypass, carotid endarterectomy, and ligature injury during surgical exploration. In trapezius palsies following injury of the accessory nerve, the upper vertebral border of the scapula moves away from the spinal vertebrae. With the lower angle of the scapula relatively fixed by muscles supplied by the C3 and C4 roots through the cervical plexus, the whole scapula slips downward and the inferior angle rotates internally, or clockwise for the right and counterclockwise for the left scapula as viewed from the back. This type of winging tends to worsen with abduction of the arm to the horizontal plane, which displaces the superior angle further laterally. The paralysis of the sternocleidomastoid causes weakness when the face is rotated toward the opposite shoulder in proportion to the degree of muscle atrophy. Bilateral involvement of the muscles makes flexion of the neck difficult. In a sequential study of patients with trapezius palsy, nerve conduction changes revealed evidence of spontaneous regeneration after complete axonal degeneration.

L004

DIFFERENTIAL DIAGNOSIS OF IMPAIRMENT AFTER CLAIMED TRAUMATIC BRAIN INJURY

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This lecture will examine the myriad of clinical issues following presumptive traumatic brain injury that may present in a typical or atypical fashion and serve as a basis for confusion regarding the true organic basis of complaints and/or clinical exam findings. Attendees will understand the assessment of true organic neurologic disease following trauma from non-organic conditions including but not limited to somatoform/factitious disorders, malingering and symptom magnification versus misapportionment of true trauma related disorders such as PTSD, depression, pain and/or anxiety to brain injury. Specific exam techniques, encompassing both neurological and neuropsychological methods will be reviewed, as germane to dissimulation assessment.

Objectives

(1) Examine critical historical and clinical findings that may assist in determining the degree of organicity of complaints being apportioned to a particular traumatic brain injury, presumptive or otherwise.

(2) Define the nomenclature germane to issues of malingering, conversion hysteria, hypochondriasis, factitious disorder, symptom embellishment, post-traumatic stress disorder and depression.

(3) Review specific neurological exam techniques useful in differentiating neurologic organicity from psychiatric conditions versus other non-organic conditions such as malingering.

(4) Enumerate neuropsychological exam techniques useful in differentiating non-organic from organic conditions including but not limited to various MMPI methodologies, Symptom Validity Testing and Forced Choice Testing.

Examine other diagnostic methodologies including Amytal interview, polygraph testing and hypnosis in the assessment and differentiation of non-organic conditions. (5)

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L005

REHABILITATION PRINCIPLES IN TRAUMATIC BRAIN INJURY

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The incidence of traumatic brain injury (TBI) in developed countries has increased during the last years and the most common cause is traffic accidents. Traumatic brain injuries range in severity from the mildest scalp abrasions, to profound trauma resulting in death. In this respect; clinical presentation depends on the nature and location of the brain damage.[1] Minor head injury, presents a Glasgow Coma Scale score from 13 to 15 and comprises mild or classic concussion syndromes. Mild concussion clinical syndrome shows transient neurologic impairment that do not involve loss of consciousness. However; classic concussion with temporary neurologic dysfunction includes short-lived coma.[2,3] After severe head injury the disability comprises a clinical spectrum of physical, cognitive, mental, behavioral, psychiatric and communication deficits. Orthopedic and medical complications are usually associated with the neurologic sequelae of severe head injury. It's also well known that; clinical findings after head injury depends not only to the severity of immediate primary brain damage but also governed by pre-injury status of the brain and secondary pathological damage to the already injured brain produced by systematic or intracranial mechanisms.[4,5]

The first stage in the development of an appropriate rehabilitation programme is to isolate the categories of problems. Neurologic deficits fall into three main categories: 1-physical, 2- cognitive, 3-emotional. Due to these topics; therapy approaches comprise and usually start with the strategies for improving motor performance.[6,7]

A treatment programme to improve motor performance requires consideration of modalities for the improvement of muscle strength and endurance, facilitation of normal movement patterns and inhibition of undesirable characteristics of movement patterns. The concept of central nervous system plasticity has helped focus the basis for restoring normal movement patterns. Cognitive remediation in neuropsychological rehabilitation area plays an important role for a functional approach. National Institutes of Health Consensus Development Panel concentrated particular emphasis on rehabilitation of cognitive, behavioral and psychosocial deficits.[8]

Daily cognitive remedial training programmes comprise exercises of attention, concentration, psychomotor speed of response, eye-hand coordination, dexterity, visuocontractional abilities, visual informing processing and logical reasoning. Daily community meeting sessions provide improvement of social behavior by enhancing to comply with social rules of conduct and by increasing the realistic acceptance of the patient's own situation. Treatment of communication and swallowing disorders, behavioral disorders and reality orientation therapy sessions enhance the value of cognitive remediation.

Therapeutic recreation activities also provide for and facilitate the development and expression of an appropriate life style.[9] The Ranches Los Amigos Levels of Cognitive Functioning helps to create a treatment program including recreation activities, as well as cognitive, behavioral, communication and motor performance training skills.

During a patient's recovery from severe head injury 3 neurologic states are well defined. The first stage of recovery begins with the initial coma and mental state at this moment is unconscious. Management priorities comprises intensive physical care. Beginning emergence from coma and altered consciousness constitutes the phase of post-traumatic amnesia (PTA) and stage 2A of neurologic state. Physical care continues at this stage. Having emerged from PTA, between 3 and 6 months post-injury (stage 2B) the patient continues in a period of rapid physical and mental improvement. Introduction of psychologic and social methods of rehabilitation may be available during this period. Recovery of cognitive disability continues between 6 and 12 months post-injury and full modalities of physical, social and psychological treatment approaches continue during this 3rd stage of neurologic status.

Family therapy approaches are very important for a successfull outcome of the rehabilitation process. Family therapy may be defined as "a professionally organised attempt to produce behavioral change in a disturbed marital or family unit by essentially

interactive, nonphysical methods".[10] Methods of family intervention include patient-family education, family counseling, behavioral family training and family therapy.

It has been well documented that; pre-traumatic and social factors of the patient play an important role on the general success and outcome results of the rehabilitation process. These factors include personality and social competence of the patient, personal and family material resources, post-traumatic social resources and interpersonal relations with family.

Therefore persons with TBI, their families and rehabilitation staff are integral to the design and implementation of the rehabilitation process and research.

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L006

DRUGS: DO'S, Don't' TS AND DILEMMAS. PHARMACOTHERAPY RECOMMENDATIONS FOR PERSONS WITH ACQUIRED BRAIN INJURY

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This presentation will explore some of the dilemmas facing patients, physicians and family members as it relates to medication prescription for post-ABI related impairments. Issues to be covered will include general principles of pharmacotherapy as related to ABI, optimizing compliance, minimizing side effects, and reviewing, in summary fashion, various treatment strategies for a number of post-ABI impairments and considerations when prescribing for persons with acquired brain injury. The presenter will also share perspectives as a physician involved in long term, community based, brain injury management on ways in which patients, as well as, family members can improve communication as it relates to prescribed medications.

Objectives

(1) Review general principles of drug treatment in persons with ABI.

(2) Examine methods to improve client complaince with regard to medication in persons with ABI.

(3) Discuss issues of drug monitoring including frequency of physician follow-up visits and adjutant laboratory test monitoring.

(4) Delineate ways to improve physician:patient and physician:family communication regarding prescribed medications and/or proposed prescribed medication.

(5) Enumerate the benefits, as well as, potential adverse effects of pharmacotherapeutic interventions for brain injury related impairments.

(6) Investigate the role of alternative/naturopathic medications as part of the drug armamentarium for impairments associated with acquired brain injury.

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L007

SOME NEW TECHNIQUES TO MEASURE HAND FUNCTION AND THE RESULTS OF THE APPLICATION OF THESE TECHNIQUES IN PATIENT RESEARCH

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Nerve injuries are common consequences of trauma of the lower arm and cause muscle paralysis and loss of motor function. To evaluate muscle force the 0-5 MRC scale is not sensitive enough. Pinch and grip strength are commonly used. These devices, however, measure the extrinsic muscles and not separately the intrinsic muscle that are mostly affected by nerve lesions.

We designed and produced an innovative instrument, the Rotterdam Intrinsic Hand Myometer (RIHM) (Figure 1). The RIHM allows measurements of the relevant intrinsic muscles. Reliability appeared to be excellent (ICC 0.93-0.98). In patients with nerve lesions intrinsic strength was found to be diminished, despite normal grip strength measurements.

A second technological innovation is the Compangle (Figure 2), a new device to measure joint angles. The Complangle is able to measure ROM more ergonomically

and comfortable. The device appeared to be reliable in hand injury patients.

Figure 1: The Rotterdam Intrinsic Hand Myometer

Figure 2: The Compangle

L008

LONG TERM RESULTS OF LOWER MEDIAN NERVE INJURY – THE NEED FOR OPPONENSPLASTY

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Median nerve paralysis that occurs at lower forearm or wrist level is referred as low median nerve paralysis and results mainly with the paralysis abductor pollicis brevis, opponens pollicis, part of the flexor policis brevis and the lumbricals of the index and middle fingers.

The main functional loss is tip to tip and pulp to pulp pinch which are dependent on the the pronating effect of an intact opponens pollicis. Bunnel has stated that in opposition the thumb pulp faces the pulp of the other fingers in such a way that thumb nail is parallel to the palm. Roach has defined opposition as the motion of the thumb as it moves from abduction in the plane of of other metacarpals to pulp-to-pulp pinch of the little finger in the flexed position. No matter how we define it, the recovery of this complex movement also necessitates a flexible dorsal skin and adductor pollicis muscle besides motor strength.

People with median nerve injury have also lost the sensation of the thumb and index finger that is very important for a prehensile pinch and successful hand function.

The purposes of this study were to try to document how successfully opposition could be accomplished in patients with median nerve injuries at the lower forearm or wrist level and to analyze the the long term results of lower median nerve injury.

23 patients with traumatic lower median nerve injuries repaired primarily and have completed their first 6- months follow up period were included in this study. The active range of motion of the two thumb joints (1st metacarpophalangeal and interphalangeal joints) were measured by finger goniometer while the patient was urged to the opposition to the fifth finger.

The tightness of the first web space was measured both in the radial and palmar direction. With the thumb in radially abducted position, the angle between the first and second metacarpal bones was measured goniometrically by a plastic midsized goniometer.

While the thumb was abducted actively in the palmar position, the vertical distance between the first finger tip and the index MP joint was measured. The slackness of the skin overlying the first web was evaluated by the "Band test" as described by Brand. As he described, a strip of adhesive tape was folded on itself to leave only 1 square centimeter of adhesive surface at one end. This adhesive surface was placed distal to the the thumb MP joint dorsally and the other end was pulled across the back of the second metacarpal bone. While the thumb was in the adducted position, a vertical line was drawn that crossed both the skin over the metacarp and the tape. Then the patient was asked to do circumduction as much as possible. Since the thumb begins to supinate as the skin becomes tighter, supination of the thumb was not permitted.

The strength of abductor pollicis longus in the palmar abduction position was tested manually. Lateral pinch force was measured while the gauge was squeezed between the pad of the thumb and lateral aspect of the middle phalanx of the index finger. Pulp-to-pulp pinch was performed between the pulps of thumb and index finger and the force was measured by the pinchmeter. Each variable was compared with the uninjured side. The results of the measurements were defined in terms of the percentages of the healthy side.

In the second part of the study, the aim was to evaluate the rate of sensory recovery after lower median nerve injury. Light touch-deep pressure sensation in the pulp and the ability to discriminate two points were measured.

Dexterity in hand functions was assessed by the Purdue Pegboard test. Patients were also asked to fulfill a questionnaire consisting of 14 daily activities that required prehensile pinch.

The mean age of 20 men and 3 women patients was 24.5±11 years (range 8-42). In 69% of the patients (n=16), the dominant hand and the injured side was right, and 30.4% (n=7) of the patients were injured on the nondominant hand. The mean follow-up period after surgery was 21.9±10 months (range 7–36).

1st MP and IP joint flexion degree were 90.9 and 94.5% respectively of the uninjured side.

The expansion of the first web space in radial direction was 87.4% (range 53–100%) of the uninjured side.

Average of the thumb circumduction measured by the Band test was 87.8% (33-100%) of the other hand.

Lateral pinch and pulp-to-pulp pinch power were 67.8% and 78.1% of the uninjured side respectively.

Most of the patients (91%) had a sensation of 3.84 or below in the monofilament test but only 39% of the patients could discriminate between moving one or two points.

As tested by the Purdue Pegboard test, patients with injuries on the dominant side could assemble significantly ($p<0.001$) less pieces than patients whose nondominant side was injured. The most frequent complaints of the patients with the injury on the dominant side were having difficulty in doing up buttons and peeling an apple.

This study about the long term results of lower median nerve injury revealed that thumb opposition as evaluated by the vertical distance between the thumb and palm and circumduction of the thumb as evaluated by the band test could be performed quite satisfactorily when compared with the uninjured hand. Patients having injuries on the dominant side may still have some difficulties in prehensile pinch due to inadequate sensation although they have almost adequate motor function.

L009

HAEMOPHILIC ARTHROPATHY: PROTECTING JOINTS, PREVENTING DYSFUNCTION AND LIMITING INCAPACITY

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Introduction

Haemophilia is an hereditary coagulopathy (absence of FVIII or FIX clotting factor) characterized by bleeding episodes, frequently occurring in joints (haemarthrosis).

The objective of this study is to assess efficacy of rehabilitational proceedings on the preservation of joint function.

Methods

We studied the records of 80 medical charts of patients with more than 10 years of age under treatment in specialized rehabilitation centres during a three-year period.

Clinical evaluation comprised muscle assessment, goniometry and radiological evaluation.

Patients were divided in two groups:

- 50 type-A haemophilic patients Group I
10 type-B haemophilic patients
Medium age: 18 y.o.
- 18 type-A haemophilic patients Group II
02 type-B haemophilic patients
Medium age: 21 y.o.

All these patients were submitted to anti-haemorrhagic factor (AHF) on demand treatment in a lower dosage than that prescribed by medical literature.

Patients from Group I underwent a rehabilitation protocol focused on the prevention and treatment of bleeding episodes, restoration of range of motion and strength of group of muscles in charge of knee extension and contraction.

Patients from control group – Group II – received the same amount of clotting factor as Group I but, for different reasons, were not submitted to this rehabilitation protocol.

Results

Analysis of data obtained from this study revealed that patients from Group I improved significantly in relation to strength, range of motion and function when compared to patients from Group II.

No significant findings were noticed with reference to synovitis and no statistically significant change on arthropathy classification occurred.

Conclusion

Findings noted on Group I (under rehabilitational treatment) suggest that rehabilitation procedures can be effective on the preservation and improvement of functional condition; however, there is no evidence that this treatment can prevent cartilaginous joint degeneration. This indicates that clinical improvement does not reflect radiological situation.

On the other hand, it was noticed that without specific rehabilitation care there is a significant progression of injury with consequent functional disability.

Functional gain by itself justifies the rehabilitational approach, which must be mandatory for the global management of haemophilic patients.

L010

REHABILITATION IN JUVENILE CHRONIC ARTHRITIS

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Juvenile Chronic Arthritis (JCA) is a form of chronic arthritis which begins prior to age 16, and is best defined as the condition of chronic synovitis in children. JCA is the most common paediatric connective tissue disease and is one of the common chronic illnesses of childhood. There is no worldwide agreement neither on diagnostic terms nor criteira for classification. The American College of Rheumatology (ACR) criteria are the most commonly used in the United States. The criteria of the European League Against Rheumatism (EULAR) criteria are used in most European countries. In 1995 the Pediatric Standing Committee of the International League of Associations for Rheumatology (ILAR) proposed a new set of criteria, using the umbrella term "juvenile idiopathic arthritis (JIA)". These criteria were revised in 1997, and they have been called the "Durban criteria".

ACR Criteria

1-Age of onset< 16 years
2-Arthritis in one or more joints defined as swelling or effusion, or presence of two or more of the following signs:limitation of ROM, tenderness or pain on motion, and local warmth.
3-Duration of disease ≥ 6 weeks
4-Type of onset of disease during the first 6 months classified as:
a-Polyarthritis: 5 or more joints
b-Pauciarticular disease (oligoarthritis): 4 or fewer joints
c-Systemic disease: arthritis with intermittant fever
5-Exclusion of other forms of juvenile arthritis

EULAR Juvenile Chronic Arthritis Criteria

- Age of onset < 16 years
- Arthritis in one or more joints
- Duration of disease 3 months or longer
- Type of disease according to onset:
- Systemic: Arthritis with characteristic fever
- Pauciarticular < 5 joints
- Polyarticular > 5 joints RF -
- JRA > 4 joints, RF +
- Juvenile Ankylosing Spondylitis
- Juvenile Psoriatic Arthritis

ILAR Criteria

- 7 category/subgroups
- Systemic Arthritis
- Persistent Oligoarthritis
- Extended Oligoarthritis
- Polyarthritis RF –
- Polyarthritis RF +
- Psoriatic Arthritis
- Enthesis-Related Arthritis

There are 3 major types of presentation: Type I systemic, Type II symmetric polyarticular form, Type IIIa pauciarticular form (boys), Type IIIb pauciarticular form (girls, < 5 years, antinuclear antibody (ANA) seropozitivity). In the differential diagnosis other rheumatic diseases (ARF, SLE, AS, PM, DM, Vasculitis (Kawasaki and others), Scl, PsA, Reiter syndrome, Mixed CTD, Behçet), infectious arthritis, inflammatory bowel disease, neoplastic disorders (especially leukemia), hematologic disorders, psychogenic arthralgia, sarcoidosis, hypertrophic osteoarthropathy, villonodular synovitis, chronic active hepatitis, familial mediterrenian fever should be considered.

Inflammation has deleterious effects on muscle and connective tissue. Pain, muscle weakness and functional limitations affect motor growth of the child. Functional limitations adversely affect cardiovascular capacity. Arthritis leads to flexion posture in the joints since joints can accomodate largest amount of fluid in flexion. As a result deficits in extension, extensor tendon weakness, spasm and shortening of flexor muscles and surrounding tissue and capsule are observed. Loss of range of motion (ROM) leads to increased energy consumption during activities. Disuse and immobility results in osteoporosis. All these problems require special rehabilitation approaches.

Aims of JCA Rehabilitation

- To minimize acute synovitis
- To control pain

- To preserve ROM
- To minimize joint contractures
- To prevent deformities
- To retain mobility
- To maintain and increase strength
- To support age appropriate behaviors
- To achieve independent activity of daily life or ambulation
- To educate the parents to enhance their commitment to the program

Physical treatment modalities, all forms of theurapeutic exercises, functional electrical stimulation, biofeedback, myofascial release and deep massage can be used during physical treatment and rehabilitation of children with JCA. Various forms of splints (resting splints, functional-assistive splints, dynamic splints), serial casting and adaptive equipment may be required according to clinical presentation. Resting splints are used during acute synovitis attacks they hold the joints in functional position and help to reduce inflammation, prevent probable deformities and help to protect ROM. Functional assistive splints help to increase ROM, support joint during activites of daily living (ADL), stabilize and help to decrease pain during active joint motion.

Fingers: Encountered deformities of the hand are terminal flexion and extension limitations, radial deviation at MCP and boutonniere deformity. Since these deformities affect ADL of the child these problems need to be urgently adressed. Activities that would improve hand function should be encouraged. Adaptive equipment (pen or knive with a thick handle) may help these children during ADL.

Wrist: Encountered problems are loss of extension, muscle weakness, overgrowth of radial head, ulnar deviation (due to muscle weakness and radius overgrowth at the distal end), volar subluxation of carpal bones at radioulnar surface (due to inflammation and flexor spasm), carpal tunnel syndrome (CTS) and rarely tendon rupture. Active extension exercises, ROM exercises using contract-relax technique, painting on the walls, voleyball using light balls, night splints may be used.

Elbow: Encountered problems are: limited ROM, flexion contractures, ulnar entrapment, romatoid nodules. For ADL and self-care full flexion of elbow is crucial. For this purpose contract-relax technique, active extensor strengthening, splints (Upper Extremity Rest Splint-UERS), serial casting can be used. For ulnar nerve entrapment synovitis should be controlled and nerve release is considered. For painful nodules ring pads are recommended. If pain and deformity can not be controlled resection of radial head is required.

Shoulder: Encountered problems are: limited ROM of glenohumeral joint**,** erosion of rotator cuff**.** Posture exercises, painting on the walls**,** voleyball with light balls**,** passive and active ROM during scapular stabilization**,** isometric and isotonic exercises are helpful in these patients. Surgery for rotator cuff lesion is considered.

TMJ: TMJ is usually involved in polyarticular JCA and spondiloarthropaties. We aim to protect ROM by stretching exercises for TMJ and night splints. After skeletal maturation, reconstructive surgical intervention for TMJ may be required.

Spine: Apophyseal joints of cervical vertebrae are commonly involved in patients with JRA. Erosion of odontoid leads to C1-2 instability and may result in spinal cord compression. Costovertebral involvement may affect pulmonary function tests. Secondary to apophyseal joint involvement spasms in M.erector spinae are observed; thoracic and lumbar stiffness and increase in lumbar lordosis may result. Flexion contracture of the hip joint is another cause for increased lumbar lordosis. Secondary scoliosis may be seen due to leg length discrepancies. Osteoporotic fractures may develop.

To prevent loss of cervical lordosis activities involved with flexion should be avoided. Active ROM, stretching exercises, breathing techniques/respiratory exercises are helpful to these children. If fusion or instability is present use of a collar during travelling is necessary. Osteoporosis should be treated if present. In case of instability and neurologic symptoms surgery is required.

Hip: As a result of limitation of extension and internal rotation and extensor muscle weakness weight bearing equilibrium is disturbed at femoral head, compansatory flexion contracture at the knee develops, hamstrings are shortened and become tight, energy expenditure is increased during ambulation. Hip extensors should be strenghtened. Prone lying, climbing stairs might be helpful. To prevent adduction place a pillow is placed between legs during lying. Prone stander might be used if necessary. Thomas stretch and Reverse Thomas stretch exercises are used in the rehabilitation of these children.

Knee: Encountered problems are flexion contracture, leg length discrepancies, quadricepss weakness, valgus deformity, hypertrophy of medial condyle due to inflammation, tightness of the iliotibial band. These children should be encouraged to sit with full knee extension. ROM and quadriceps strengthening exercises, functional exercises (swimming, stair climbing etc) are advised. Resting night splints, static stretch exercises are beneficial.

Ankle: If tibiotalar joint ROM is limited (foot can not move to neutral) heel-strike is impossible. Due to limitation of subtalar motion walking is affected; varus and valgus deformities may develop. So for ambulation ROM of the ankle should be preserved. Heat modalities, active and passive ROM exercises, strengthening especially for peroneal muscles help to preserve ROM of the ankle joints. Ankle Foot Orthosis (AFO), aircast ankle brace might be required. If pain is continuous and instability is present surgical fusion might be considered.

Feet: In children with longstanding disease feet are typically short, thick and high arched due to premature fusion of bones and joints at the tarsometatarsal joint. In the midfoot there is a tendency for supination or pronation. Toes may be dorsally subluxated at MTP joints- overloading at the metatarsal heads. Longitudinal arch may be lost. Tightening of plantar fascia leads to metatarsus adductus. Other deformities such as hallux valgus and hammer toe might be encountered.

To enable "toe-off" extension at the MTP joints should be preserved. To protect flexibility of toes active and passive ROM exercises are helpful. Intrinsic muscles of the foot should be strengthened. Modifications of the sole of the shoes help ambulation. To help stability during inversion and eversion posterior part of the shoes should be enlarged. To help to reduce valgus stress on the first metatarsal joint anterior part should be large. Good arch support is essential.If the ankle is unstable, boots with anterior lace should be preferred.

Lack of ambulation is an indication for hospitalization and requires urgent and intensive rehabilitation.

Factors that lead to loss of ambulation:

- Pain
- Active inflammation
- Flexion contractures of the hip and knee
- Extensor muscle weakness (Gluteal muscles and quadriceps)
- Loss of endurance
- Loss of motivation
- Dependence
- Secondary gains

Factors that affect ambulation (pain, muscle weakness, length discrepancies) should be evaluated using gait analysis. If child can not cooperate "prone stander" or lying in prone position should be encouraged. Wheelchair is not permitted. Flexion contracture of the knee joint is the most important deformity that would affect ambulation. For ambulation full extension at the knee joint is crucial. Intensive stretching exercises twice a day, active, resistive exercises for quadriceps, hip abductors and extensors, tilt-table or prone stander for standing is important for rehabilitation. Upper extermities should be strengthened for using walking aids such as walker. Swimming,

low intensity aerobic exercises and bicycle ergometer might be used for endurance training. Ambulation training can start in the pool, continues in the paralel bars. Later posterior walker or forearm crutches are used.

Risk factors for osteoporosis in chilren with JCA

- Active inflammatory disease
- Decreased mobility
- Glucocorticoid medication
- İmmunosupressives ?
- Protein/caloric malnutrition
- Poor Ca/Vit D intake
- Decreased sun exposure
- Decreased height and weight
- Pubertal delay

Prevention of osteoporosis in chilren with JCa

- Protect ambulation, increase physical activity
- Enrichment of diet (Ca & Vit D)
- Regular control of BMD, turnover markers
- If steroids are indicated they should be used in minimum doses, for minimum period

Treatment of Osteoporosis in JCA

The use of calcium (1-5 years 800 mg/day, 6-10 years 1200 mg/day and 11-24 years 1500 mg/day;) and Vitamin D (400 IU/day) supplementation might help to prevent bone loss. Calcitonin (100-200 IU/day) rapidly improves symptoms of vertebral fractures but it is still considered to be experimental. Growth hormone (0.46 mg/kg/week or 12-24 IU/m^2/week and bisphoshonates (Alendronate 5-10 mg, according to body weight, < or > 20 kg) seem to be promising.

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L011

PAIN CLINIC COST EFFECTIVENESS AND EFFICACY

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Introduction

Pain is one of the most common symptoms bringing patients into health care systems for evaluation and treatment. Studies have shown that 11% of the adult population, report a persistent pain condition. It is estimated that as many as 15 million adults suffer low back pain, with indirect medical costs of at least $5 billion, and 93,000,000 working days lost each year. Back pain is considered one of the most expensive ailments inflicted upon advanced industrial societies. Costs are estimated to be at least $16 billion each year in the United States alone. About 80% of these costs are incurred by those 7% to 10% of patients who go on to develop chronic low back pain.

Chronic pain that produces significant emotional, physical, economic and social alternations in the patient and his/her family is label *chronic pain syndrome*. The Uniform Data System for Medical Rehabilitation (UDS) has established a classification of impairments that cause disabilities. As defined by UDS, the pain syndrome impairment group includes cases in which the major disorder is pain (usually chronic and benign) of various etiologies. Included are pain of the neck, back and extremities, with other pain syndromes specifically mentioned—including spondylosis, intervertebral disc disorder, sprains and strains. The operational definition excludes those patients entering rehabilitation with neurological deficit.

Because of the broad scope of pain syndromes that exists, and the multitude of available treatments, it will not be possible to review the efficacy of interventions used to treat the entire spectrum of pain. Therefore, this review focuses on the chronic pain syndrome and the role of pain clinics in its management.

Issues Specific to Chronic Pain Syndromes

Chronic pain syndrome can produce significant emotional, physical, economic and social alterations in the lives of the patient and his/her family. Rehabilitation programs for individuals with chronic pain syndrome are goal-oriented and require integrated and coordinated efforts among multiple health care professionals. The major focus of these programs is to reverse the alterations in life style that accompany the experience of chronic pain and produce secondary disability. In addition to the medical and physical management, social and interpersonal skills need to be addressed—including the participation of family members. Because chronic pain syndrome has truly biological, psychological and social components, the treatment objectives should include restoration of social functioning of the patient as well as pain relief or control of pain behavior. Thus medical treatment of the impairment must be combined with psychosocial rehabilitation to be successful in minimizing handicap. The major treatment objectives in the rehabilitation program for chronic pain syndrome should include:

- to decrease pain behaviors
- to increase activity levels and independence in all activities of daily living
- to eliminate or reduce the use of nonessential analgesic medications
- to increase the patient's and family's psychosocial coping skills
- to re-engage the patient in vocational or avocational activities
- to return the patient to usual social activities

Overall Level of Methodological Rigor of the Literature

Much of the literature pertaining to rehabilitation of chronic pain syndrome consists of retrospective record reviews, surveys or review articles. Numerous experimental or quasi-experimental studies were identified. In many cases the inferences which may be drawn from this literature was limited by the lack of control groups, non-equivalent control groups, weak statistical analysis and other limitations to internal and external validity.

Several meta-analyses pertaining to the efficacy of rehabilitation for chronic pain syndrome have been conducted. The level of methodological rigor, however, is variable. For instance, one meta-analysis, which was performed with 164 studies dealing with non-surgical treatments for chronic pain. This study was found to have been conducted with inappropriate statistical techniques and field to

critically evaluate the quality of the studies used for the meta-analysis. Another meta-analysis, performed with 65 studies of chronic pain interventions, provides stronger evidence of the efficacy for the rehabilitation interventions, which included psychological services, medical, physical and occupational therapy, in part because of the greater attention given to the quality of studies included in the meta-analysis.

Principal Findings and Implications

- Following treatment at a multidisciplinary pain center, the patients reported a reduction in pain ranging from 16-60%--comparable to the pain reduction reported after surgery. These reductions were reasonably maintained up to five years following treatment.
- More than 65% of patients treated in a multidisciplinary pain center discontinued use of opioid medications and were still medication free one year following discharge from the program. In contrast, patients not treated as such facilities reported an average reduction in medication of only 6% one year following treatment.
- On average, 65% of patients treated in multidisciplinary pain centers report increased activities at termination of treatment compared to 35% for patients not treated in these facilities.
- Patients treated at multidisciplinary pain centers are three to six times less likely to be hospitalized later and have significantly fewer surgeries for pain than those patients not treated in these facilities.

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L012

ORTHOTIC AND PROSTHETIC MANAGEMENT IN REHABILITATION

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Orthoses and Prostheses

Orthoses and prostheses for the upper and lower limbs are an integral part of the rehabilitative medical management of patients with functional deficits. This presentation will focus to the lower limbs since the greatest majority of patients will have walking related problems.

Orthoses are devices applied to the external surface of the body to achieve one or more of the following; relieve pain, immobilize musculoskeletal segments, prevent or correct deformity and improve function. Orthoses provide a direct support component to the braced segment and limit the range of motion of a joint. This mechanism may be use to partially or fully immobilize the joint, and may also give rise to deformity prevention or correction, as well as improve function and reduction of axial loads with resulting joint pain relief. In conjunction with the above two mechanisms, a more difficult mechanism to visualize is the fact that orthoses modify the total static and dynamic force/moment distributions in the braced and in more distal segments ("in" joints or about a joint center) as well as provide a substitute power source for weak muscles while maintain walking safety and efficiency.

The Ankle Foot Orthosis allows foot plantar/ dorsiflexion adjustment, if the device includes an adjustable ankle joint. For a Knee Ankle Foot Orthosis, knee angulation as well as foot posture may be adjusted.

After comfortable fit and cosmesis are attained, the alignment of the device is the most critical component in the acceptance of the orthosis as a functional aid for the patient.

Orthotic Alignment

Informal visual analysis of gait is routinely used by clinicians to improve the dynamic alignment of an orthosis. This type of analysis does not provide quantitative information and has many limitations due to the speed and complexity of human locomotion**.** Gait deviations and compensations present in the walking pattern of individuals who use orthotic devices further complicate the alignment methodology. Traditionally a trial and error system is used to attain the best dynamic alignment of a brace**.**

Prosthetics

After surgery the patient with a lower limb amputation will use prosthesis as a weight-bearing device. Ideally full body weight of the patient will be borne through a newly created man-machine interface (the socket/ residual limb). Bony prominences, skin scar traction, shear and perspiration will complicate this function. For these reasons the residual limb must be surgically constructed with care to optimize the transfer of loads, maintain muscle balance, and assume the stresses necessary to meet it's new function. The more joints and muscles lost and replaced by a prosthesis, the greater the rehabilitation challenge, loss of the normal locomotor mechanisms and therefore the greater the energy cost of ambulation as well as the degree of impairment.

Prosthetic prescription options for the amputee have changed dramatically over the past 10 years. Selecting the most appropriate componentry for prosthetic restoration of the lower limb amputee is an extremely challenging task in view of the variety and complexity of new prosthetic components (prosthetic feet, ankles and knees), socket fabrication techniques, suspension systems and available materials. Ideally, an expert team of professionals in close communication with the patient should accomplish this task. Members of the team should include a surgeon, a physiatrist knowledgeable in amputee rehabilitation and prosthetics, a certified prosthetist, an occupational therapist, physical therapist, recreational therapist, psychologist, social worker and the patient and his family.

Gait training is integral in the rehabilitation process. A new amputee or an experienced one that receives a prosthesis that has different components should participate in such training. This program should be a coordinated effort between the physical, occupational, recreational therapists and the prosthetist with frequent physiatric input. Each one of the team members will use different techniques to teach and review all of the important topics that need to be learned by the amputee.

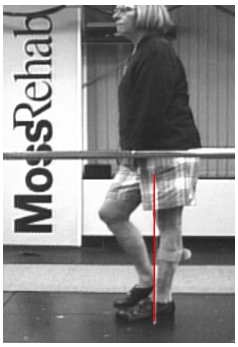
The patient should learn prosthetic management including understanding the basic principles behind the function of each of the components in the prosthesis, its maintenance and care. Gait training initially for technique and then for velocity on flat surfaces is essential, progressing to uneven surfaces and elevations. A review and practice of the use of the prosthesis in transfers, driving, sports and other activities should always be included.

Gait Analysis

Commonly clinical observation and patient feedback are the primary sources of information on orthotic and prosthetic alignment. Usually, joint position and/or range of motion are continually adjusted until both the clinician and the patient are satisfied. For this approach to work, several factors need to be present: the clinician needs to have a keen biomechanical sense, the patient should be able to provide "good" feedback and there should be only a unidirectional set of joints to adjust. Unfortunately these conditions are not always present nor are they the only factors that will affect the alignment process. Even under the ideal circumstances alignment can not be completely and accurately evaluated until the patient has had a chance to walk in and accommodate to the device over time, and until a stabilization of the compensatory muscle strategies and symptoms has occurred.

Gait analysis affords the clinical team the opportunity to infuse much needed objectivity in to the process of orthotic and prosthetic alignment assessment. Experienced clinicians may assist their biomechanical orthotic/prosthetic prescription process with the use of special quantitative and semi-quantitative assessment methods including (in order of frequency of use): video recording (slow motion and instant replay) and instrumented gait analysis [Kinematics (temporal and spatial measures and motion analysis), kinetics (force analysis), and dynamic electromyography (analysis of muscle activity) and energetics (metabolic)].

In some laboratories force platforms when combined with special hardware, permit real-time visualization of a force vector as depicted below. Based on its semi-quantitative nature, simplicity and no need for instrumentation of the subject, this information is of significant importance when attempting to optimize biomechanical orthotic or prosthetic alignment.



L013
AMPUTEE REHABILITATION
Kamil Yazıcıoğlu, MD

L014
REHABILITATION IN POST-POLIO SYNDROME
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Post-polio syndrome has been formally recognized as a clinical entity since the mid 1980's when the First International Post-Polio Conference was held in Warm Sprigs Georgia, USA. Post-polio syndrome complaints can be summarized in three major categories that are presented in order of frequency: new joint pain, increased muscle weakness and fatigue. This syndrome becomes apparent between the 3rd and 4th decades after the original polio viral infection. Poliomyelitis affected tens of thousands of children and adults until the mid-1960s when vaccination became widespread around the world. The infection of the brain and the spinal cord by the poliovirus is associated with death of motor neurons, loss of innervation to muscle fibers, muscle weakness and atrophy. Post-Polio syndrome will affect over 50% of the more than 20,000,000 polio survivors who commonly complain of increasing weakness affecting "normal' and infected muscles.

Our clinical experience indicates that the risk of developing PPS appears to correlate with the severity of the initial poliomyelitis infection and the degree of compensation required to perform daily activities.

What causes PPS? At the present time there is limited scientific information in this regard. The current working theory suggests that the normal attrition of neurons that occurs with aging and superimposed overuse due to chronic strain of muscles and joints that have been forced to compensate for partially damaged cells may trigger the symptoms. Recent immunologic data suggests a possible persistence of the poliovirus. However this has not been proven by other laboratory studies.

Two types of fatigue have been described by PPS patients, generalized fatigue that requires increased rest, or sleep, and local muscle fatigue. Local fatigue is a manifestation of muscle overuse. Generalized fatigue can be a manifestation of many other diseases, but in PPS, it is characterized by the lack of stamina and the constant desire to sleep. It has a cumulative effect (the patient feels more fatigued as the week progresses, and recovers over the weekend when there is an opportunity to rest). This can be aggravated by depression due to the inability to function in a demanding society while suffering from chronic fatigue. Activity planning, rest periods in between activities, walking aids and at times the use of medication has proven successful in alleviating this problem. The use of energy conservation techniques and modify life style to provide frequent periods of rest in an attempt to prevent muscle overuse that could lead to further irreversible damage has effectively controlled some of the presenting symptoms. A program of gentle supported aerobic exercises for short periods of time (3 to 5 min.), twice or 3 times per day utilizing a bicycle without resistance or walking in warm water followed by stretching has been used in our clinic. Exercise of stronger muscles to prevent disuse atrophy, while carefully avoiding overuse is also an appropriate intervention.

In some of these patients, weakness of the ventilatory muscles may further aggravate some of their symptoms. Careful monitoring and cautious exercise to promote increase endurance and respiratory muscle strength has been advocated. In a few patients nighttime supported ventilation may be necessary.

Musculoskeletal deformities are common in this group of patients. Surgical correction may be needed in up to 25% of them. Tendon lengthening, bone realignment and joint

stabilization can improve function and facilitate bracing in this patient population.
The use of walking aids (cane, crutches, etc.) or braces, limited exercise, rest and lifestyle changes have produced long-term symptomatic relief of joint pain.
This presentation will review the different rehabilitation interventions available to ameliorate the clinical complaints of this patient population.

L015

COMBINATION THERAPY IN OSTEOPOROSIS

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Although it is known that estrogen ,biphosphonates and calcitonin increase bone mass by decreasing bone resorption, this agent seems to act by different mechanisms: Estrogen may increase calcium absorption. In addition, current evidences suggestets that estrogens blocks cytokines in the bone microenvironment that increase formation of osteoclasts and expends their lifespan. On the other hand, biphsphanates exert their effect on resorption primerely through alterations in the structure and function of the osteoclast and possibly by promotion of osteoclast apoptosis. Calcitonin inhibits the development of osteoclast precursors and decreases committed pre-osteoclast fusion to form multinucleated cells. Thus, the use of two antiresorptive agents may produce greater inhibition of osteoclastic activity, leading to larger suppression of bone turnover. Bone turnover rates, which are elevated in post menopausal women, are reduced to rates within the range seen in healthy premenopausal women when estrogen, bisphonates, or raloxifene are given individually.
Studies combining these agents have demonstrated decreases in markers of turnover larger than those seen with individual agents, suggesting a greater suppression of bone resorption. Bone biopsies support this finding. Microdamage in the form of microscopic cracks occurs in bone secondary to physiological repetitive loading during dayly activity. The accumulation of microcracks in bone leads to reduced strengh, and microdamage may increase the risk of fatigue fractures, and is implicated in the increased suscebility of older bone to fracture.
Microdamage is normally repaired through physiological remodeling processes by replacing damaged Bone with new bone. Indirect evidence suggests that extremely low bone turnover rates may produce detrimental consequences in the bone, leading to an increased fracture incidence. Trials on combination therapy have shown increases in BMD over what occurs in each agent. The magnitude of the increased difference is not significant at some sites in some studies , and is relatively small, less than 2% after one year of therapy. The effect of this antire-sorptive combinations on BMD,as seen in this studies,was not truly addtive and certainly not synergistic.
Finally, none of this studies has shown a significant difference in subsequent fracture incidence when a biphosphanate is given in addition to estrogen, compared with each agent alone.
Regarding combinations with anabolic agents, GH does not seem to have a role in the treatement of postmenopausal osteoporosis, but adding Alendronate to GH therapy in GHD osteoporotic patient improves BMD. Adding PTH to ongoing HRT causes improvement in BMD at the spine and the femur, the two most vulnerable areas for subsequent fractures, but the effect on the distal radius has not been reported. Animals studies suggest that there is no advantage to giving antiresorptives before or during PTH administration and in some situations there might be a disadvantage. The place for antiresorptive therapy appears to be after PTH is stopped. In Humans simultaneous treatement with PTH and Alendronate has not been reported, but an NIH sponsored trial is underway. The data that are currently available support the notion that responses to parathyroid hormone therapy are maximized when bone turnover is not been suppressed during the course of treatement.
Doubts remain about whether BMD changes are a reliable surrogate for antifracture efficacy. Until feature research demonstrates anti-fracture efficacy, combination therapy cannot be recommended and should not be used routinely. Integrating safety and cost issues will eventually determine whether those combinations should become the standard of care.

L016

SOCIAL AND ECONOMIC BURDEN OF OSTEOPOROSIS

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As an inevitable consequence of ageing, human beings faced by paying a price, mostly with chronic health problems. The gradually increase in average life span of the world's population place burden on societies and health care systems. Measuring the size and severity of the global burden of osteoporosis is vital to determine the strategies and priorities of health policies.
Osteoporosis affects approximately 200 million women worldwide. It was estimated that, in Rochester, Minnesota, USA, 27% of the women are osteopoenic and 70% are osteoporotic at the hip, lumbar spine or distal forearm[1] and furthermore approximately 40% of all white women and 13% of white men in the United States experience at least one clinically apparent fragility fracture in their lifetime [2]. In the United Kingdom 23% of the women aged older than 50 years are estimated to have osteoporosis as defined by WHO, that is slightly lower than the rate in USA. The general prevalence of osteoporosis rises from 5% among women aged 50 years to 50% at 85 years of age while the comparable figures are 2.4% and 20% among men [3].
Osteoporosis is similar to other serious chronic disease in terms of mortality, disability, quality of life and costs. One of the most important complications of the osteoporosis is hip fracture, which is related with high morbidity and mortality. Numbers of elderly people with femur fracture are increasing, furthermore the high mortality rate after hip fractures have not fallen over the past 20 years [4]. More than half of women aged 50 years will experience a fracture in their lifetime [5]. Fracture rates vary in different countries, the highest rates are seen in North America and Europe, particularly Scandinavia [6,7]. It is estimated that in Canada, at least one in four women older than 50 years will have one or more osteoporosis-related fractures in their lifetimes [8]. In Europe, the incidence of hip fractures increases exponentially with age, with rates of 2 per 100.000 person-years in women aged <35 years rising to 3032 per 100.000 person-years in women aged ≥85 years; respective rates in men are 4 and 1909 [9]. The risk of osteoporotic fractures is lower in Africa and Asia, but worldwide projections suggest that it will increase markedly in the future [10]. Only half of the patients regain the independency in their daily activities. Not only hip fractures but also vertebral fractures seem to have an incrementally significant and negative impact on quality of life [11]. Vertebral fractures are often not reported because symptoms are generally nonspecific. However, vertebral fractures warrant particular attention because they are an important risk factor for subsequent osteoporotic fractures. And no more than half of patients at least with a vertebral fracture received prescription for the treatment of osteoporosis [12]. 85% of postmenopausal women in Europe do not believe they are at risk of osteoporosis (despite fact that 1 in 3 women will be affected).

80% of women with osteoporosis don't aware of risk factors prior to diagnosis. Less than 20% of women with osteoporosis have been treated in most countries. If women are not being diagnosed then they cannot be receiving treatment even they have high risk for osteoporotic fractures.

It has been shown that osteoporosis has significant impact on quality of life of women in the community [13]. Many patients suffer from pain and disability associated with vertebral fractures. The main factors in health related quality of life in patients with vertebral osteoporosis are physical limitation due to pain, to be in need of social support, embarrassing body image and depression.

The economical impact of osteoporotic fractures is large and growing steadily. The International Osteoporosis Foundation (IOF) estimates that in the European Union alone, an osteoporotic fracture occurs every 30 seconds and more than EUR 4.8 billion were spent in 2001 by E.U. [14].Total average costs during the period four months after confirmed fractures was 9,421 Euros for hip fractures, 6,871 Euros for spine fractures and 1,773 Euros for wrist fractures. Economical consequences can be evaluated by different methods. In cost-effectiveness analysis (CEA), benefits are measured in natural units. These could be the provided Quality of life scores, which can be obtained from health related quality of life (HRQoL) instruments. In cost-utility analysis (CUA), the benefits are measured in healthy years.

Do we use too much or too little medicine in the treatment of osteoporosis? From the patient of view clinical cure, quality of life, out of pocket cost and satisfaction with treatment process are the most important expectations. On the other hand, healthcare purchasers, regulatory agencies and reimbursement committees are often only interested in costs that affect their budget. The cost of diagnostic and monitorising procedures have to be also taken in consideration while estimating economical burden of osteoporosis.

Osteoporosis should be given the same consideration, by physicians and policy makers, as other serious chronic diseases. It has to be reminded that prevention of the low bone mineral density is always easier, low cost and more humanistic approach than the treatment of brittle bones. Promoting high calcium and vitamin D intake, exercise, avoiding from smoking and alcohol, developing more cost-effective strategies to screen more people in order to diagnose osteopenia in early stages and improving the awareness of the society on osteoporosis should be given consideration.

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L017

CLINICAL AND INSTRUMENTAL EVALUATION OF GAIT DEVIATION IN UPPER MOTOR NEURON SYNDROME

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Gait deviation is the result of pathological lower limb posture after lesions that result in an upper motor neuron syndrome (UMNS), associated with global motor control loss (proximal lower limb, trunk and upper limb), cognitive dysfunction and may also interfere with function such as bed positioning, sitting balance, wheelchair level activities, transfers, standing and walking.

The lack of normal motor control and/or the presence of static foot deformity alters the cyclical kinematic pattern of lower limb and trunk during gait. There may be impairment of advancement of the body weight over the supporting limb and to swing the unloaded limb forward in preparation for the next step. Foot pain, skin breakdown (lateral border, fifth metatarsal) and knee hyperextension (and/or varus) are frequently associated to this gait deviation and the compensation needed for the lack of adequate base of support, limitation of ankle dorsiflexion, dysrhytmic and restrained forward translation of body mass, asymmetrical weight transfer and interference with weight bearing on the involved limb. Gait deviations and compensations in the involved limb induce compensations for the non-involved limb, pain and fatigue.

The gait disability (the net effects of one or more impairments) can be expressed like reduction of:

- efficacy (reduction of mean self selected walking speed and reduction of maximum walking velocity to travel from one place to another)
- safety (need of assistive devices, supervision or assistance)
- efficiency (increase in energy expenditure).

The handicap (the net effects of disabilities interacting with the physical and social environment on the individual performance of a typical social role) can be expressed as limitations during

activities of daily living (ADL) or social activity in indoor and/or outdoor activities

L018

NEW APPROACHES IN REHABILITATION AND PHYSIATRY

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Objectives

The objectives of this presentation are to identify selected trends influencing the disciplines of rehabilitation and physical medicine, discuss their current impacts on practitioners and comment on how they might alter practices.

Methods

This presentation includes the observations of a senior academician and practitioner regarding selected influences likely to result in new approaches to the practice of rehabilitation and physical medicine. The author has been the chair of departments of Physical Medicine and Rehabilitation (PM&R) in the United States (US) since 1973. He also has participated as a leader in many US PM&R societies, the International Society of Physical and Rehabilitation Medicine and the long range planning committees of several rehabilitation-related governmental and non-governmental organizations.

Discussion

Increased life-expectancies have resulted in older patients with multiple medical problems. The treatment of these illnesses is one factor increasing medical care costs, resulting in all countries, whether developed or developing, to seek to reduce the resources they allocate to health and other human services. Thus, the inpatient stays permitted in hospitals, whether for acute medical and surgical services or early post-acute rehabilitation services, are becoming shorter (1).

The early discharges from general hospitals results in the patients of rehabilitation hospitals and centers having more severe medical problems and more co-morbidities. Also, these facilities often discharge their patients to the community with continued rehabilitation needs.

There is increased awareness that the rehabilitation needs of patients with catastrophic onsets of significant disabilities form a continuum requiring attention in all of the facilities in which they are treated, including general hospitals, rehabilitation hospitals, homes and outpatient facilities.

Practitioners of rehabilitation and physical medicine will have opportunities to serve as consultants in acute hospitals to assist in the early implementation of rehabilitation programs, and to organize the continuum of care programs that will follow the initial hospitalizations. However, most of the rehabilitation interventions in acute hospitals will be administered by nurses and therapists. PM&R specialists working in acute hospitals and early post-acute rehabilitation facilities will need to be comfortable and competent when working with more acutely ill patients. They also will need to be able to organize programs that continue meeting their patients' rehabilitation needs after their discharge to their homes.

Another trend is that governments are encouraging privatization of greater segments of health care in order to access the resources of non-governmental organizations (2). Although private services may be of high quality, the need to pay reduces the equitable availability of services to all that need it. Great disparities already exist internationally in the availability of rehabilitation services; these exist between countries, patients with or without resources and those in rural or metropolitan areas.

Practitioners are likely to be faced with decisions related to whether they practice within the public or private sectors, or some combination of both. They may find the options they can recommend for patients will vary depending upon the payment source, a condition that already exists in the United States.

Shorter lengths of stay in acute hospitals and in early post-acute rehabilitation facilities have resulted in emphasizing compensatory approaches to improving function, rather than reversing impairments. These individuals must be both physically and medically safe before they are discharged to home settings. At the same time, basic science investigations strongly suggest that enriched sensorimotor experiences associated with robotic protocols can improve impairments that result from cortical injury (3).

Practitioners will need to periodically review this literature in order to provide the best care for their patients.

Conclusions

The environments in which practices of rehabilitation and physical medicine exist continue to change, influenced by both economic and scientific influences. This necessitates the need for practitioners to regularly monitor the trends likely to influence their futures.

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L019

CHRONIC LOW BACK PAIN IN THE NETHERLANDS: STATE OF THE ART

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Low Back Pain (LBP) is a major health problem in the Netherlands as well as internationally.

It is a great medical problem. About 2 to 5% of the Dutch population develops LBP. 10% of the LBP patients become chronic or recurrent. LBP is a common cause for absenteeism and disablement for work. In foreign countries one speaks about the "Dutch disease". In the Netherlands about 0.7 million dollars are spent on LBP. These high costs are related to medical and surgical care, but especially to lost work time, long term disability, insurance and security payments.

Rehabilitation medicine plays an important role in the treatment of LBP. According to the international classification of impairment, disability and handicap (ICIDH), specialists in physical and rehabilitation medicine try to reduce impairments and disabilities of LBP patients in order to reintegrate them into society. The "NHG-standard" (a protocol about LBP for general practitioners in the Netherlands) advises a multidisciplinary programme, such as above mentioned, after 3 months without recovery, especially with non-specific LBP. Non-specific LBP are estimated 90 to 95% of the total amount of LBP patients. Therefore the Back Rehabilitation Programme was started in the rehabilitation centre Het Roessingh in 1988. However there was a lot of scepticism about the effectiveness of these so-called Back schools.

Since the early nineties a number of systematic reviews, meta-analyses and clinical trials have been performed to evaluate these treatments. For the majority of LBP patients the pathophysiologic mechanism of LBP is unknown. In recent years the emphasis has shifted from biomedical to bio-psycho-social models. Numerous studies have shown that there is little direct relationship between pain and disability and suggest that the bio-psycho-social approach offers the foundation for a better insight in how pain can become a persistent and disabling pain problem. The main assumption is that pain and pain disability are not influenced by organic pathology, if found, but also by psychological and social factors.

An important model is the fear-avoidance model, which explains the role of pain related fear of movement or (re)injury; kinesiophobia. This model characterises patients in the acute phase with a high or low level of pain, movement or (re)injury. Patients with high levels of fear develop pain-catastrophizing thoughts and believe that movement, physical work or exercise will lead to further pain or injury. Consequently these patients will avoid activities they fear. These patients ("avoiders") will develop "disuse" syndrome and become physically deconditioned. It is known that kinesiophobia is an important factor in the development and in the maintenance of disability. Another model explaining the development of chronic LBP is the avoidance-endurance model, which partly corresponds with the fear-avoidance model.

This model characterises besides the "avoiders" a group of patients, i.e. those who develop chronic LBP despite low levels of kinesiophobia. In clinical practise the last group of patients could be classified as "over-loaders", characterised by high activity levels, depressive symptoms and denial of pain. However it is not clear whether fear of movement is related to physiological mechanisms or not.

In the Netherlands "graded activity" and "problem solving skills therapy" are main parts of the rehabilitation treatment of chronic LBP. "Graded activity" is an operant behavioural treatment that aims at increasing activity levels using quota systems. Included in the treatment are baseline levels, treatment contract, positive (self)reinforcement for activity increments, and workplace visit. "Problem solving skills therapy" is a cognitive behavioural treatment that aims at increasing problem solving skills.

However, heterogenity among studies in patient characteristics, predictors, treatment and outcomes limited evidence. All studies are descriptive or exploratory in nature. Consistent evidence is found for the predictive value of pain intensity, subjective work-related parameters and coping abilities. Personal-, health-, social status and physical related variables consistently lacked predictive value. No consistent evidence is found for psychic health or beliefs.

At this moment it is not possible to define a generic set of predictors of outcome of multidisciplinary rehabilitation treatment for chronic LBP patients.

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L020

MANAGEMENT OF LOWER LIMB SPASTICITY WITH INTRATHECAL BACLOFEN

Raouf Gharbo

Types of Movement Disorders
Dystonia:
Chorea:
Athetosis:
Choreoathetosis:
Ataxia:
Pathophysiology of Spasticity
Theory
• Imbalance between excitatory and inhibitory impulses to the alpha motor neuron
• Due to a lack of descending inhibitory input to the alpha motor neuron
Factors That May Increase Spasticity
Measuring Spasticity
• Ashworth and Modified Ashworth scales
• Spasm and reflex scales
• Passive quantitative tests
• Active tests of movement
Ashworth Scale
Modified Ashworth Scale
Spasm Scale
Spasm Frequency
Possible Advantages of Spasticity
• Maintains muscle tone
• Helps support circulatory function
• May prevent formation of deep vein thrombosis
• May assist in activities of daily living
Goals of Spasticity Management
Rehabilitation Therapy
Oral Medications
• Baclofen
• Diazepam
• Dantrolene Sodium
• Tizanidine
Site of Action for Oral Drugs
Drug
Baclofen:
Diazepam:
Dantrolene Sodium:
Tizanidine:
Site of action
GABAb receptors in spinal cord
Central nervous system
Skeletal muscles beyond the myoneural junction

Central acting (spinal and supraspinal) at alpha2 – adrenergic receptor sites
GABA
• Gamma-butyric acid (GABA)
• an inhibitory neurotransmitter
• Baclofen
• thought to act as a GABA agonist in the spinal cord, reducing positive input to the alpha motor neuron
Intrathecal Delivery of Baclofen Injection

ITB™ Therapy
SynchroMed® Infusion System Components
• Pump
• infuses drug at programmed rate
• Catheter
• delivers drug to the intrathecal (subarachnoid) space of the spinal cord
Programmer
• allows for precise dosing
• easily adjustable dosing
Intrathecal Delivery of Baclofen Drug
• Spinal level
• Excitatory neurotransmitters
Pharmacokinetics of Baclofen
Oral
• 60 mg dose: 0.024 mcg/mL IT lumbar concentration
• Half-life 3-4 hours
Intrathecal
• 600 mcg/day dose: 1.24 mcg/mL IT lumbar concentration
• Lumbar to cervical concentration is 4:1
• Half-life 4-5 hours
Four stages of ITB Therapy
ITB™ Therapy
Minimize Risks Through
• Patient selection
• Education and training
• Careful follow-up
• Performing recommended procedures
Indications for ITB™ Therapy
Step 1 - Include
1. Severe spasticity
2. > 4 years of age and enough body mass to support the system
3. Appropriate, agreed-upon goals
4. Patient/family motivation
Step 2 - Exclude
1. Infection
2. Allergy to baclofen
Efficacy in Adults and Children
• 86% cerebral origin (screening test)
• 97 % spinal cord origin (screening test)
• Upper and lower extremities
• Both patients with functional goals and patients with goals of improving comfort and ease of care
Potential Benefits of ITB™ Therapy
• Decreased spasticity
• Reversible
• Noninvasive programming
• Improved activities of daily living
• Ease of care
• Decreased pain related to spasticity
ITB™ Therapy
Causes of Overdose
• Dosing error
• Pump malfunction
• Programming error
• Injecting catheter access port during refill
• Filling catheter with syringe during surgery
• Use of concomitant drugs
Signs of Baclofen Overdose
• Drowsiness
• Lightheadedness
• Dizziness
• Somnolence
• Respiratory depression
• Seizures
• Rostral progression of hypotonia
• Loss of consciousness progressing to coma
Patient Education
Review At Discharge
Pump Alarms
Audible alarm system alerts to 3 conditions:
• Single beep
• Low battery voltage
• Low reservoir volume
• Double beep
Pump memory error
Dose Reductions
• Reduce the daily drug dose by 10-20% if the patient experiences intolerable side effects
• Reduce the dose slowly
Complex Dosing
Individualized Rehabilitation
Additional Considerations
• Cognition/function
• Motivation for treatment
• Family support
• Reimbursement
Preoperative Therapy
• Ease of care
• No therapy recommendations
• Functional Goals
• Strengthening
• Range of motion
Seating System
• Consider changes in posture
• Assess support
• Facilitate function
Orthotics
• Support joints
• Prevent deformity
• Optimize function

L021
BOTULINUM TOXIN TREATMENT IN SPASTICITY
Maria Matilde De Sposito

L022
STROKE EFFECTS ON LANGUAGE USE IN CONTEXT: IMPLICATIONS FOR REHABILITATION
Nachum Soroker, Asa Kasher, Rachel Giora, Gila Batori, Cecilia Corn, Mali Gil, and Eran Zaidel

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Objective

To examine the effect of localized hemispheric lesions on processing of the basic speech acts (BSAs) of *Question*, *Assertion*, *Request* and *Command*.

Material and Methods

(a) *Subjects*: 27 right- and 31 left-brain-damaged (RBD, LBD) stroke patients, and 21 matched normal controls. Most LBD patients manifested aphasic language problems of different kinds. (b) *Tests*: In order to overcome the problem of unnatural setting in formal testing we created interactive situations that elicit the appropriate BSA in a natural way. In addition we used standardized aphasia and neuropsychological tests. (c) *Lesion analysis*: CT lesion information was digitized and reconstructed separately for each patient on a set of standard templates, using a normalization procedure. Quantitative measures of lesion extent, in a set of pre-determined regions of interest, were correlated with pragmatic impairment as assessed by the BSA battery.

Results

ANOVA revealed a significant disadvantage of the two pathological groups relative to normal controls. The four BSAs showed different localization patterns.

Conclusion

Both left and right cerebral damage produce significant deficits relative to normal controls. The abnormal processing of BSAs by non-aphasic RBD patients demonstrates that pragmatic functions can be lost in cases where syntax, semantics and phonology (controlled mainly by the left hemisphere) are relatively preserved. This finding has an important implication for rehabilitation, as impairment in processing pragmatic aspects of verbal communication might be associated with significant handicap, even in the absence of overt aphasia. Processing of the different BSAs by LBD patients was strongly affected by perisylvian lesion location, with each BSA showing a distinct pattern of localization. This finding suggests marked differences in the abilities of aphasic patients to process sentences according to their speech act context. Recognition of individual patterns of preservation and loss of BSAs should guide speech pathologists in planning an appropriate treatment strategy for each patient.

L023

TREADMILL TRAINING IN STROKE PATIENTS

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Restoration of gait is a major goal in the rehabilitation of stroke patients. Modern concepts favour a task-specific repetitive approach to walking training and a clear benefit from more intensive therapy has been demonstrated.

Treadmill training / locomotor therapy with and without partial body weight support (BWS) enables stroke patients to repetitively practice complete gait cycles. Weight bearing, stepping and balance are trained simultaneously while patients are walking on the treadmill with BWS. It allows stroke patients to start walking training very early.

Animal studies have shown that the adult cats with complete spinal cord transection can recover an almost normal gait pattern after locomotor training with weight support for the hindquarters. These observations were at the basis of the concept of central pattern generator (CPG) located at spinal level. CPG's are responsible for autonomic activity of alternating flexor and extensor leg muscles during locomotion. CPG's are highly responsive to segmental sensory inputs and show evidence of learning during step training. Walking training on a treadmill with BWS is intended to optimise locomotor related sensory inputs, which may improve the timing and coordination of motor activity.

Several studies on the effect of treadmill training with BWS have reported favourable effects on the gait pattern and walking capacity of patients with neurological conditions. Hesse[1] reported that treadmill training with BWS facilitates hemiparetic patients to practice a favourable gait. Gait training resulted in prolongation of single stance period of the affected limb, higher gait symmetry, less plantar flexor spasticity and a more regular activation pattern of the shank and trunk muscles as compared with floor walking. Hesse proposed that treadmill training is superior to physiotherapy based on Bobath concept in nonambulatory chronic patients. Nilsson[2] et al showed in patients with hemiparesis after stroke in early phase similar improvements of walking ability, balance and sensorimotor function in comparison with physiotherapy according to motor relearning programme by Carr and Shephard.

Treadmill training can be started at the early phase as well as at chronic phase of stroke rehabilitation. During training patients walk suspended by a harness to support weight over the treadmill. Either one or two therapists assist gait at setting the paretic limb, controlling knee stability and trunk movements.

Treadmill exercise testing can be used to assess cardiopulmonary function in paretic stroke patients and aerobic treadmill training improves cardiovascular fitness and functional mobility.

The three main variables in treadmill training are degree of body weight support, treadmill speed, and duration of the therapy.

Speed: Hesse[3] showed that the amplitude of activation of the shank and thigh muscles increased, the pattern of activation became more normal and patients walked more efficiently at higher speeds than self selected over ground walking velocity (SSV). Sullivan et al[4] demonstrated that training with BWS at speeds comparable with normal walking velocity was more effective in improving SSV than training at speeds at or below SSV. Pohl et al[5] suggested that a training protocol involving an aggressive progression of speed is more effective in improving gait parameters than training without significant speed increases.

Body weight support (BWS): Hesse[1] demonstrated improvement of qualitative gait parameter, spasticity and functional muscular activity with BWS of 15–30% body weight. More support was not advisable because of functional muscular activity reduction and change of gait pattern.

Visintin[6] reported in a randomised trial better mobility outcome parameters for stroke patients performing treadmill training with BWS versus patients without BWS. In this study BWS was gradually reduced from 40% to 0%. Danielsson[7] showed in stroke patients with hemiparesis that 30% body weight supported condition on treadmill requires less oxygen consumption than full weight bearing, therefore treadmill training with BWS can be tolerated better by deconditioned patients or with cardiovascular problems.

Training duration: Training sessions were between 20 min – 60 min, 3- 5 times per week. Patients trained between 2 and 6 weeks. In the study of Macko[8] 6 months of progressive treadmill training improved cardiovascular fitness and gross motor efficiency of hemiparetic gait in chronic stroke patients.

A systematic review[9] concluded that thert' were no statistically significant differences of walking speed and independent walking ability between treadmill with or without BWS, and other interventions. However among patients who could walk independently at the start of treatment, treadmill trainng with BWS

appeared to be more effective at increasing walking speed, however this conclusion was not robust. The authors found the results of the review not conclusive.

Treadmill training with partial body weight support is a promising approach in gait rehabilitation after stroke. It promotes recovery of gait function and cardiovascular fitness of hemiparetic individuals.

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L024

TREATMENT OF SPASTICITY-WHERE ARE WE?

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Spasticity is a component of the upper motor neuron syndrome characterized by exaggerated tendon reflexes, clonus, pathological reflexes, mass synergy patterns, muscle weakness, loss of selective motor control and loss of hand dexterity. Muscles show a physiological resistance to passive motion called muscle tone. Spasticity is the increase in this physiological muscle tone, therefore the terms "spasticity" and "increased tone" are used interchangeably. Spasticity is velocity dependent. The faster the passive movement, the greater the resistance of the muscle. The increase in muscle tone causes loss of trunk balance and difficulty of active movement in the extremities.

Spasticity is difficult to define, the pathophysiology is obscure, findings on examination inconsistent and treatment not always successful. Understanding the physiology of normal movement may help the physician in the management of spasticity. The pathogenesis is presumed to be an increase in the excitability of the lower motor neuron. This presents as hyperactive stretch reflexes on clinical examination. There are many hypotheses to explain this hyperexcitability. One of the hypotheses states that there is a change in the balance of excitatory and inhibitory inputs to the motor neuron pool. When the inhibitory inputs are reduced, the interneurons send excitatory impulses to the lower motor neurons and they become hyperexcitable.

Spasticity is very uncomfortable for the patient, causes difficulty in movement, abnormal posture in sitting and standing, contractures leading to deformities, pressure sores and pain. When muscle tone increases, muscles become tight, fibrosis and eventually bony deformity lock the joint into a fixed contracture. How fast a contracture will develop depends upon the severity of spasticity, and the muscles involved. Contractures progress more quickly in some muscles. Sitting is difficult because of increased adductor and hamstring muscle tone. The patient slides out of the wheelchair and cannot be positioned properly. He cannot transfer to and from the bed, wheelchair and bathtub. Perineal hygiene and dressing require more effort. The ambulatory patient has trouble initiating movement. He cannot wear his braces. Energy cost of movement increases. As a result, there is loss of function. Patient care becomes more burdensome.

Increased tone may be useful as well. It helps maintain the legs straight and thereby supports the patient's weight against gravity. The patient with increased tone in trunk extensors may stand and take a few steps. Spasticity may help preserve muscle bulk and bone density.

Spasticity can be measured by clinical examination, mechanical instruments and electrophysiological techniques. The modified Ashworth and Tardieu scales are commonly used for clinical evaluation. They measure tone intensity but do not evaluate the effect of spasticity on function. Mechanical instruments measuring the resistance of the muscle to passive stretch and electrophysiological measures showing the hyperexcitability of the stretch reflex are used only for research purposes.

Treatment is necessary when there is loss of function, contracture formation, deformities, pressure sores or pain. Additional indications include difficulty in positioning or patient care. Even though a wide range of treatments exist, none of them are fully satisfactory. Unwanted side effects limit the use of certain modalities. Some patients do not respond to any of the antispasticity measures. The success of treatment depends upon having specific goals, choosing the correct method according to the problem at hand and monitoring for side effects and complications.

Treatment options are divided into reversible and permanent (surgical) procedures all of which aim to modulate the stretch reflex. They can also be classified as systemic or local sometimes combined to decrease side effects and to improve outcome.

Physiotherapy is a fundamental part of spasticity management, however the antispastic effect of techniques such as positioning, ice, and exercises last for only a couple of hours. For longer duration the stretch on the muscle should be maintained for several hours every day. This is possible with the use of rigid splints or serial casting. The effects are maximal if the cast or the splint is applied after the muscle is relaxed. Some believe that casts decrease muscle tone by creating atrophy in the already weak spastic muscle. Casts may also cause pressure sores. There are many options for oral antispastic medications however, their use is limited due to unwanted systemic side effects. Neurosurgical ablative procedures are largely abandoned because of inefficacy. Intrathecal baclofen pumps have a high success rate, however they are expensive and the complication rates are still quite high. Botulinum toxin and phenol blocks are generally satisfactory for focal relief of spasticity. The near future will witness improvements both in the technology of pump implantation and oral antispastic medications.

Goals of spasticity treatment
1. Increase function
to perform better in activities of daily living
to walk better
2. Increase sitting ability and balance

3. Prevent deformity&decrease contractures

4. Pain relief

5. Improve hygiene and patient care

Treatment methods
Physiotherapy
Positioning
Exercises
Stretching
Neurofacilitation
Electrostimulation
Splinting & Casting
Oral medications
Baclofen
Diazepam
Clonazepam
Dantrolene
Tizanidine
Intrathecal medications
Baclofen
Morphine
Clonidine
Neuromuscular blocks
Local anesthetics
Phenol
Botulinum toxin
Orthopedic surgery
Selective dorsal rhizotomy

L025

THE CHANGE OF THE SPASTICITY AFTER SELECTIVE POSTERIOR RHIZOTOMY IN CEREBRAL PALSY

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The treatment of the spasticity is the main topic in management of cerebral palsy. There are various methods to treat the spasticity such as physical therapy, orthosis, motor nerve block and surgery. Surgery includes orthopedic surgery and selective posterior rhizotomy. Selective resection of abnormal rootlets using intraoperative electrical stimulation as described by Fasano and his colleagues, has made it possible to eliminate the spasticity of cerebral palsied children without sensory complications. However there are some reports complications including hypotonia, weakness, spinal instability and urinary incontinence.

We reviewed our 10-year experience of selective posterior rhizotomy(SPR), with an emphasis on surgical outcome concentrated on improvements in functional ability and adverse effects. We had performed SPR in 208 patients between 1990 and 1999. All patients showed an overall improvement (over95%) in spasticity, passive range of motion, and gait pattern. Preoperative ambulatory functional level and age were very important predictive factors for further improvements in postoperative functional ability. Compared with the younger children, the older ones lacked a full range of motion preoperatively, and they continued to lack a full range of motion postoperatively, despite the decrease in tone achieved by SPR. Most postoperative complications such as hypotonia, urinary retention, spinal deformities, and sensory changes were temporary and not functionally important. We conclude that SPR is an effective method of alleviating spasticity and provides lasting functional benefits as acceptable complication levels in spastic children with cerebral palsy.

L026

A CLINICAL APPROACH TO OSTEOPOROTIC VERTEBRAL FRACTURES

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Musculoskeletal pain, common in osteoporosis, is one of the most frequent symptoms for which medical assistance is sought. Osteoporosis represents one of the main causes of back pain in postmenopausal women [1]. On the other hand in the same population non-osteoporotic vertebral deformities are seen as often as osteoporotic ones, and they are also main causes of back pain. In women up to 60 years back pain was found mostly due to degenerative disorders of the spine [2]. The management of musculoskeletal pain in these patients, especially in the osteoporotic ones, combines an antiresorptive agent with analgesia, thus increasing the compliance of the osteoporotic patient to a long-term treatment and preventing the disuse due to painful attacks, especially of the spine [3]. Osteoporosis related fractures have important health consequences for older individuals, including disability and increased mortality. Clinical or sub-clinical vertebral fractures are a common cause of acute back pain, but it is surprising that most of these patients do not receive an anti-osteoporotic treatment. In fact in a retrospective study only 18% of medical records indicated that fracture patients had been prescribed anti-osteoporotic medications. Back pain in the majority of these patients is treated with prolonged bed-rest, local and systemic analgesia and bracing [4]. The elongation of bed-rest in these patients results in increase of bone loss (identified by increase of hydroxyproline excretion) and muscle weakness and joint stiffness. Another interesting aspect is that as the most of the osteoporotic vertebral fractures happen in high bone turnover patients [5] and in these patients post-fracture immobilization is an additional risk factor of an increased bone loss. Nasal salmon calcitonin in a daily dose of 200 IU has an equivalent analgesic effect to 100 IU of injectable salmon calcitonin [6,7,8]. The analgesic efficacy of nasal calcitonin was tested in 32 men and 68 postmenopausal women with a mean age of 76 and 71 years respectively, who had sustained a non-traumatic vertebral fracture within the previous 5 days and was confirmed radio graphically and

clinically [24]. The patients were hospitalised for a period of 28 days and were randomly assigned to receive either 200 IU of salmon nasal calcitonin or a matching placebo nasal spray. In addition patients were permitted to take paracetamol as a rescue analgesic up to 6 tablets of 500 mg daily. Treatment was initiated after baseline measurements on day 0. Pain evaluation was performed daily using a visual analogue (VAS) 10-degree scale (0= no pain, 10= agonizing pain). Pain was tested during different locomotor functions e.g. bed rest, sitting, standing and walking. In our experience if a patient records a pain above 7 (in the VAS scale) is not capable of attempting the recommended locomotor function. In turn, a rating of pain less than 7 suggests that patient does not require nursing and bed rest and that he is able to begin physiotherapy. After the completion of 28 of follow-up it was found that pain was reduced dramatically in the group receiving calcitonin ($p<0.001$). The analgesic effect of nasal calcitonin was negatively associated to the number of paracetamol tablets consumed. Pain rating on the VAS, showed that the most patients gradually gained full mobility after the first week of calcitonin treatment. The number of patients who remained bedridden was significantly greater in the placebo group at all time points than in the calcitonin group. Percutaneous vertebroplasty by using calcium phosphate cement obtains also early pain relief and improves the integrity of the osteoporotic vertebral body [9]. On the other hand the mini surgical intervention may cause serious complications to patients with recent fractures, such as paraplegia [10],and the occurrence of new vertebral body fracture [11].

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L027

WHAT IS THE PLACE OF DXA ON OSTEOPOROSIS IN 2004?

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As a result of the increased awareness among health providers worldwide of the importance of osteoporosis, bone density measurement has become the cornerstone of the diagnosis of osteoporosis and the follow up of treated patients.

There are, however, problems inherent to bone mass density measurement. One such problem is the multiplicity and diversity of available techniques for BMD measurement. Another problem arises as a result of the discrepancy between the ability of BMD to predict fracture risk and the partial responsibility of BMD increase in reducing fracture risk after antiresorptive therapy. A review of the role of DXA in osteoporosis management in 2004 is perhaps warranted in view of the above.

This new clinical discipline is now well recognized with the DXA as the gold standard of bone density measurement. It is easy to perform and is highly reproducible. It is still relatively inexpensive and is a noninvasive tool for bone assessment.

Two years ago NIH launched a new definition of Osteoporosis which emphasized bone quality in addition to bone density and some people thought that BMD will lose importance.

This lecture will review the following:

1. DXA technique, precision and accuracy
2. How to optimize and insure the accuracy of a DXA center
3. Indications of DXA use

L028

OSTEOPOROSIS AND BONE QUALITY-MODELLING AND REMODELLING

Franco Cirillo

L029

MANAGEMENT OF BLADDER DYSFUNCTION AFTER SPINAL CORD INJURY

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The management of neurogenic bladder dysfunction is a crucial component of spinal cord injury (SCI) rehabilitation program. The loss of normal bladder function in these patients is disabling and results in increased risk of urinary tract deterioration giving rise to significant morbidity and occasionally to mortality. A complete urological screening of every SCI patient is mandatory.

Disruption to the neurological pathways as a consequence of SCI results in a spectrum of dysfunction, ranging from the acontractile bladder to neurogenic detrusor overactivity and detrusor-sphincter dyssynergia.The level of the lesion is a major determinant of

individual urological sequelae, however the exact diagnosis is best established by detailed urodynamic studies.
Goals of any method of bladder management is preserving renal functions, reducing morbidity and helping them to live more meaningful lives by making them continent. This is achieved by attaining low pressure filling and emptying, combined with minimal residual volumes. Bladder function decreases the person's social, vocational, avocational and recreational potential if it is not to be viewed from the total aspect of the person's ability to function in the society. With a proper bladder management system that optimizes both renal and social functions, the person with a SCI can enjoy a much healthier life.The most appropriate method of bladder management should be implemented on the basis of urodynamic studies.Other factors influencing management include manual dexterity of the patient, available resources, patient preference, and patient compliance.
Clean intermittent catheterisation (CIC) may be the preferred option for well-motivated and cooperative paraplegic patients with good hand functions. Patients and the family members (possible care givers) should play a role in the selection of management options, and the final decision should depend on the patients' comfort, convenience and quality of life. In selected SCI patients, the choice of an indwelling catheter (IC) may be reconsidered if other methods fail.
Although renal failure is no longer the leading cause of mortality, urinary tract infection (UTI) continues to be a common problem throughout the life of many SCI individuals causing significant morbidity. High UTI rates in CIC group could be due to the lack of compliance to the CIC schedule, frequent change of attendants without adequate training in catheterization techniques, intrinsic factors related to poor host defences and inappropriate choice of bladder management. No single form of management gives an absolute protection against infection.There is no need to treat bacteriuria and asymptomatic UTI.Antibiotics and antiseptic agents are not beneficial for the long-term prevention of UTI in SCI individuals, and their application may in fact be harmful by way of producing resistant bacteriae.The treatment of symptomatic UTI should involve use of the narrowest-spectrum antibiotic for the shortest possible time, principally to reduce the formation of resistant strains.
Annual evaluation of all SCI patients should include history and physical examination, urinanalysis, determination of 24-hour creatinine clearence, upper urinary tract imaging with intravenous pyelogram or renal ultrasound and urodynamics. Even with the newest techniques only periodic evaluations can reduce the risk of morbidity and mortality related to the urinary system.

L030

LIFE SATISFACTION AND QUALITY OF LIFE IN SPINAL CORD INJURY

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For more than 40 years, quality of life has been considered as an important aspect of therapeutical assessment for severely disabled patients.
The main purpose of our lecture is :
to identify objective factors (social and economic status, impairments, functional limitations) contributing to the subjective quality of life of subjects presenting with residual neurological deficits from a traumatic spinal cord injury (SCI) and living at home
to present various measures were proposed, with an emphases on subjective feelings and reports from the patient himself. A brief review of medical literature is made, from general population to patient and disabled people studies, in order to point out the main determinants of quality of life in SCI,
that can be used in a Mediterranean population.
Instruments used for assessment are reviewed. Some consider the concept as a whole; some focus on a particular dimension; some try to integrate the concept as multidimensional. Reliability and validity are discussed. Lastly, the concept of quality of life is included in the general process of rehabilitation. We emphasize the use of a multidimensional measure of perceived health for the assessment of rehabilitation programs in SCI.
To illustrate our lecture, a descriptive study of a sample of 30 post-traumatic SCI patients followed at our department of Physical and Rehabilitation Medicine in Tunis, 23 males / 7 females, mean age 36,9 +/- 17,7 years (10-70). A clinical and functional examination was conducted (neurological level T12-L1 63%) and questionnaires were filled out by the subjects. The following parameters were assessed: impairments (sensory and motor ASIA scores: ASIA A 63%), disability (Functional Independence Measure FIM: mean data 107,4), and quality of life (Reintegration to Normal Living Index: 55,69 +/- 17,51/100, Associated Factors to Family Function FACE III).
Level of lesion and independence are not the most important factors influencing quality of life; the major determinants are related to personality, depression and social behavior.

L031

GENETIC BASIS OF OSTEOARTHRITIS

Beyazıt Çırakoğlu
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Osteoarthritis (OA) is the most common joint disease. The presence of genetic factors at the basis of OA has been discussed for long time.In recent years candidate OA susceptibility genes have been identified by different approaches. The effect of the mutations and single nucleotide polymorphisms (SNP) of these genes have been studied in humans and transgenic animal models.The studies implicated some probable biological pathways leading to OA. The obtained knowledge about the genetic basis of OA contributes the development of novel gene therapy techniques and pharmacogenomics for the therapy of the disease.

L032

MEDICAL TREATMENT AND NEW TRENDS IN RHEUMATOID ARTHRITIS

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L033

REHABILITATION IN INFLAMMATORY SERONEGATIVE OR SEROPOSITIVE DISEASES

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There are many kinds of seronegative or seropositive arthritis. The three most common and most important varieties of arthritis, managed by a specialist in PRM, are rheumatoid arthritis, osteoarthritis and spinal column ankylosing spondylitis. Although there are some differences in rehabilitation between the three mentioned kinds of arthritis, the main principles of the program are the same. And general, the principles of medical rehabilitation analyzed here, can be applied to most of the other forms of arthritis. For the management, the PRM specialist has the responsibility for the Rehabilitative program. He prescribes appropriate medications or uses several means of rehabilitation. He educates and coordinates the Rehabilitation team, which is consisted, besides the PRM specialist, from the patient and his/her family, the physical therapist, the occupational therapist, the nurse, the psychologist, the dietician and the social worker.

At the presentation, the characteristics and the goals of the joint Rehabilitation program are described; the several means (heat, cold, hydrotherapy, exercises, rest, mechanical agents and education) used for joint rehabilitation are explained in details with their effects; emphasis is given to educate and support the patient with devices for the activities of daily living, mobility devices, transportation aids and splints.

Special attention is given to the problems of the rheumatoid hand and the rheumatoid foot. Also, the complications and the special principles of ankylosing spondylitis management are described, as well as the exercises program for mobilizing the spinal column and strengthening of the relevant muscles. A list of advices necessary for the activities of daily living of every patient suffering from ankylosing spondylitis is presented.

L034

REHABILITATION PRINCIPLES IN RHEUMATOID ARTHRITIS

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Rheumatoid arthritis (RA) is the most common inflammatory arthritis and it usually leads to disability, deterioration in quality of life due to progressive damage in the joints. The rehabilitation management of the patients with RA is as imperative as medical management to decrease the potential long-term disabilities. Therefore, a multifactorial approach utilizing medications and rehabilitative techniques is essential. First and foremost, inflammation must be supressed, as this is the major cause of joint destruction and disabilities. The management of RA includes education to understand the disease; medications, splinting, therapeutic modalities and rest to control inflammation and pain; exercise to preserve or restore joint motion, increase muscle strenght and provide cardiovascular conditioning; education in joint protection principles; orthotics; the use of adaptive and assistive devices.

The rehabilitative management of RA must be planned according to the stage of inflammation (acute, subacute or chronic), the number and the site of the joints involved and the severity of the involvement. Before prescription a rehabilitation program, the physiatrist must obtain specific information on daily living activities, range of motion and muscle strenght.

Pain control must be the first consideration in any rehabilitative prescription, since it can limit the effectiveness of the therapy and is the major cause of depression. Cold application on the inflamed joints, several times daily, reduces pain and ROM exercise can be done comfortably. In the acute stage of the disease the use of resting splints for involved joints can be helpful to decrease pain and maintain proper functional position, but should be avoided long-term due to some side effects as decrease in ROM, muscle weakness, decrease in aerobic capacity. Splints can be worn 24 hours a day in acute stage of the disease, with removing twice daily and performing exercise at this period, to prevent contracture. So finding the best balance of rest and exercise is essential. The ideal exercise for the patient during acute phase is static isometric exercise which produces minimal muscle shortening and maximum muscle tension without moving the joint.

Prevention and correction of deformities is the most important part of rehabilitation in RA. Most deformities involve hands, knees, feet and shoulders. Orthotic devices can make activities of daily living much easier. A structured exercise program for non-inflamed joint should focus on stretching, strenghtening and aerobic conditioning while conserving energy in the rheumatoid patient. Some modifications for exercise as beginning slowly and progressing gradually, avoiding rapid or repetetive movements of affected joints and adapting physical activity to the needs of the patient might be required. Impairments and limitations of ankle/foot, wrist/hand, knee, hip and cervical spine must be carefully examined and therapeutic interventions as orthotics and assistive devices, adaptive equipment, thermal modalities (superficial heat or cold, electrical stimulation) and specific exercise that includes duration, intensity and frequency for each joint must be prescribed. Aquatic rehabilitation is excellent since there is bouyancy of the water and reduction in weight bearing, and is well tolerated even in the acute stage of RA.

L035

EVIDENCE BASED REHABILITATION OF LOW BACK PAIN

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Low back pain (LBP) is a classic topic for rehabilitation specialists, but the approach to this problem have greatly changed in these last years. Not long ago some physicians used to say that all patients with LBP had to be visited by specialists to prevent the increase of the problem: now everything has changed and the behavior is the other way round. Many have the idea of “wasting time” because of patients that, in their view, should be treated by General Practitioners (GPs) and it seems to be difficult even to recognize that there are at least some important patients in that group of people, i.e. really disabled persons because of LBP: according to epidemiology, 3-4% of the population. Looking at this situation as rehabilitation specialists, this is a paradox, in times in which LBP is more and more recognized by all scientists and experts as a “bio-psycho-social” problem, i.e. an “impairment-disability-handicap” problem, to use old fashioned words, or, to be up-to-date, a “health condition” that produces “impairment, limitation of activities and restriction of participation”. Who should have an arsenal better than a rehabilitation specialist to treat these patients, both on cultural and therapeutic side?

We know that LBP is one of the many, different, small health problems typical of all human beings. LBP is not a diagnosis, is much more some kind of a syndrome, a common final way of many

different, undistinguishable pathologies. No way to say if it is the disc or the joint, or muscles or ligaments; no way to know if it is inflammation, or blood congestion, or strain, or repetitive micro-trauma. At least today. We ignore almost all on the anatomic-pathological side, but we know a lot on what are the risk factors of the first episode and, most important, of chronicization (that is the most awful end of the story). In this way, we know what to do and what to avoid. We also know how to treat: we must first of all be good human beings approaching the suffering person in front of us, so to entirely face the problem in all its aspects: biological, psychological, social. This since the beginning (the acute phase, up to 2-4 weeks), but more and more as time passes (sub-acute phase, from 1 to 3-6 months), to avoid chronicity (i.e. the 5% of patients with higher disability, with almost no possibility of exiting from this condition – only 5% of resolution – that costs 70% of the entire costs for LBP). And when LBP is chronic, then we need to physically, psychologically and socially reactivate and rehabilitate: forgetting pain to treat the patient in its completeness.

Considering all this, rehabilitation specialists continue to have a major role to play in LBP, but we must well bear in mind that this role is full of difficulties, because of the complexity of the puzzle. Apparently, the easiest issue should be to have a rehabilitative approach. But, looking critically at what happens in this field, it seems that we loose our know-how that we easily apply in other health conditions: we tend not to apply a functional approach (aimed at increasing function through rehabilitation), but a symptomatic one (aimed only at relieving pain – but in this case why should we be better than a simple, low-cost pain killer ?) or even a simple anatomical approach (aimed at changing the situation of an anatomical piece, should it be an apophyseal joint, a ligament, one or more muscles, and so on – but, what about the actual knowledge that refuses a precise anatomical background of LBP ?); it looks like we are not psycho-social, even if here we frequently face people with big physical, but also psychological, impairments that limit their activities and participation; it seems that we forget our rehabilitative projects and programs, and simply go to straightforward diagnostic conclusions and therapeutic proposals. To effectively and efficiently treat LBP we simply and definitely must be rehabilitation specialists. A typical complication is that it is necessary to create good teams, including all therapeutic and social partners we need to obtain a full recovery of the disabled low back pain sufferers. Creating teams is much more difficult in a typical outpatient setting as that of LBP, than in an inpatient one; but it is unavoidable to obtain good results. Rehabilitation always implies working in team and LBP treatment is not an exception at all.

This field is full of dilemmas and it is characterized by a great majority of acute, auto-resolving cases: to deal with this situation we need to be scientifically well oriented. For years Rehabilitation has been considered the Cinderella of scientific approaches, mainly because of the absence of instruments to evaluate treatments, but also because in the past we were not used to have such a behavior. Reality is rapidly changing and an evidence-based methodology is already in the arsenal of rehabilitation: this must totally be applied in the treatment of LBP too.

We must remember that acute patients will relieve by themselves in a few days or weeks: these are not really our patients. Our interest should fully go to the significant minority of chronic LBP sufferers, whose situation is rarely changeable in terms of pain, but almost always variable in terms of disability, increasing physical, psychological and social function, and quality of life. In between these two populations there are the sub-acute LBPs: here a preventive paradigm is determinant.

Low back pain is a difficult field, that requires a fully bio-psycho-social, rehabilitative approach. This means scientific knowledge, psychological and social attention, ability in creating partnership and quality of care. In LBP treatment, as in all other situations, it is not possible to delegate, to forget, to underestimate. Otherwise, we will continue to loose our fight against LBP: as physicians, as rehabilitation specialists, as patients, as society.

L036

QUALITY OF LIFE IN BEHCET'S DISEASE

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Musculoskeletal diseases related disability is generally grouped into three types: physical, emotional and social. A large number of disease spesific and generic multidimensional health measure have been developed which measure different aspects of the disease. Outcome measures can be summarized as five dimensions: death, disability, discomfort, drugs, economic cost (1).

Behcet's Disease (BD) is a chronic disease with oral apthae, genital ulcers, ocular inflammation, skin lesions, as well as articular, vascular, neurological, pulmonary, gastrointestinal, renal and genitourinary manifestations. The main histopathological finding is a widespread vasculitis of the arteries and veins of any size or thrombophilia according to the site of involvement. BD may just present with one or two symptoms but others may gradually emerge over years. It is a long term, cyclical disease and patients may have symptoms-free periods of weeks, months or years (2).

At present, there are no laboratory markers that correlate well with the clinical activity in BD. This facts led to development of an instrument, Behcet Disease Current Activity Form (BDCAF) (3). Scoring is based on the history of new clinical features present over the preceding 4 weeks prior to assessment. Standardized questions were developed for all parts of the form. The face validity of the proforma was determined following worldwide collaboration with physicians and ophthalmologists managing patients with BD. The BDCAF scores oral and genital ulceration, skin, joint and gastrointestinal involvement, presence of fatigue and headache according to the duration of symptoms. The presence and type of large vessel and central nervous system involvement are documented. Eye activity was deemed present if there was a history of blurring of vision or if the eye was painful or red. Measurement of the disease activity has to involve several organ systems.Disease "severity", disease " activity", and established damage should be considered separately. Fatigue is a common problem, also cognitive impairment without any neurological involvement (3). Acneiform skin lesions seem to be more frequently accompany arthritis. Monoarthritis and oligoarthritis affect essentially knees and ankles rarely with a chronical survey (2). The most important determinant for the prognosis of vision is related to central nervous system involvement. Vision loss develop within the firts two years of diagnosis (4). Psychiatric symptoms appear one to eight years after neurological symptoms (5).

Validation of Turkish version of BDCAF has also been performed which is found to be useful especially in classical triad of BD but more experience is needed for other parts (6).

Beck depression and anxiety Questionnaires, Short- form 36 (SF-36) have been used in the assessment of health related quality of life (HRQOL) in BD. Correlations with duration of illness, mental state, anxiety and depression with quality of life and life satisfaction were investigated (7,8).

Hopefully, further projects will contribute on the confirmation of the construct and cross-cultural validation of these questionnaires.

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L037

EPIDEMIOLOGY OF OSTEOARTHRITIS

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Osteoarthritis is characterized by focal areas of loss of articular cartilage within synovial joints, which are associated with hypertrophy of bone (osteophytes and subchondral bone sclerosis) and thickening of the capsule. Clinically, the condition is characterized by joint pain, tenderness, limitation of movement, crepitus, occasional effusion, and variable degrees of local inflammation. It can occur in any joint but is most common in the hip; knee; and the joints of the hand, foot, and spine. The preferred definition for epidemiological studies includes both X-ray findings (1) and the presence of joint pain on most days (2), as either finding alone leads to overestimates.

Due to the epidemic nature of the condition, the World Health Organisation (WHO) has declared this decade (2000-2010) the "Bone and Joint Decade". Musculoskeletal conditions are the main cause of disability among older age groups. Moreover, the pain and physical disability brought about by musculoskeletal conditions affect social functioning and mental health, further diminishing the patient's quality of life. Musculoskeletal conditions are a major burden on individuals, health systems, and social care systems, with indirect costs being predominant. Annual socio-economic costs (direct + indirect) in Germany approximately 8 billion €, in the USA roughly 33 billion $.

Osteoarthritis (OA) is the most prevalent form of arthritis, one of the most common diseases affecting humans and a common cause of disability. Osteoarthritis affects 39 million Europeans, in the UK for example 8 million people have arthritis of which osteoarthritis is the most common, over 16 million osteoarthritis sufferers live in the USA. Osteoarthritis is the eighth most common cause of disability worldwide – in the USA, it is already in first place. The prevalence of OA is expected to increase dramatically during the next 20 years as the population ages (3). Increases in life expectancy and ageing populations are expected to make osteoarthritis the fourth leading cause of disability by the year 2020. Few data are available on the incidence of osteoarthritis because of the problems of defining it and how to determine its onset. OA is a major cause of disability in people aged 65 and older. Osteoarthritis affects 9.6% of men and 18% of women aged >60 years. In some people, evidence of osteoarthritic changes may exist by the second or third decade of life (usually without associated symptoms). By age 40, almost everyone has some osteoarthritic changes in weight-bearing joints (e.g., hip and knee joints) and, by age 75, virtually everyone has changes in at least one joint. Estimates from the prevalence of osteoarthritis increases indefinitely with age, because the condition is not reversible. Data obtained from autopsy studies indicate that there is almost universal evidence of osteoarthritic damage in people aged 65 and over (4).

Although OA is worldwide in distribution, geographic and ethnic differences have been reported. The sites of the body involved vary with ethnic group (e.g. hip disease is less common in Asians than in those of Western origin). For example, the prevalence of hand and knee OA is similar among Europeans and Americans. There is greater variation in the distribution of hip OA with markedly lower rates in African Blacks, Asian Indians, and Hong Kong Chinese (5). It has been suggested that the lower rates detected among these populations may be due to lower rates of congenital or developmental abnormalities and, in some cultures, the common use of squatting postures, which force the hip through extreme ranges of motion (3).

Worldwide estimates are that 9.6% of men and 18.0% of women aged $\geq$60 years have symptomatic osteoarthritis (6). The incidence of symptomatic hand, hip, and knee OA increased with age and women had higher rates than men, especially after age 50. Men are affected more often than women among those aged <45 years, whereas women are affected more frequently among those aged >55 years (7). Radiographic studies of US and European populations aged $\geq$45 years show higher rates for osteoarthritis of the knee: 14.1% for men and 22.8% for women (8).

Australia indicate that the incidence of osteoarthritis is higher among women than men among all age groups (2.95 per 1000 population vs 1.71 per 1000) (9). For women, the highest incidence is among those aged 65–74 years, reaching approximately 13.5 per 1000 population per year; for men, the highest incidence occurs among those aged $\geq$75 years (approximately 9 per 1000 population per year). Around age 80, there was a leveling off or a decrease in the incidence of OA in both groups and all joint sites (3). Surveys focus on the tibiofemoral joint; osteoarthritis of the patellofemoral joint has a major impact but is less studied. Symptomatic radiographically proven osteoarthritis of the knee has been found among 2.9% of women aged 45–65 years (10,11). Hip osteoarthritis is less common, with a radiographic prevalence of 1.9% among men and 2.3% among women aged >45 years in one Swedish survey (12).

It is clear, that continuing research on both the epidemiological and economic aspects of the disease are vital and these tools range from public health interventions which target at risk groups, to cost-effectiveness analyses of interventions and treatments associated with the disease, the development of treatment guidelines and protocol which take into account both the health and economic consequences of treatment.

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L038

DIFFICULTIES IN THE DIFFERRENTIAL DIAGNOSIS OF OSTEOARTHRITIS

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Osteoarthritis (OA) is the most common musculoskeletal disorder and affects at least 10% of the population. The prevalence rises dramatically with age and carries with it significant impact on function, activities of daily living, work and social interaction (1, 2). Over recent years, the understanding of the pathophysiology of osteoarthritis has undergone several changes. Osteoarthritis is now believed to be a collection of hetero-geneous conditions with distinct risk markers rather than a single entity.

Osteoarthritis as a structural disease can affect many joints. The whole joint is implicated in a disease process characterized by hyaline cartilage loss and periarticular bone response typified by marginal outgrowths, osteophyte formation and sclerosis. Low-grade synovial inflammation, ligament laxity, and muscle inhibition and weakness are accompanying features (2, 3, 4).

Pain is undoubtedly the most important presenting feature in the clinical syndrome of osteoarthritis.

Clinical history and examination remain the cornerstones of diagnosis, prognosis, estimates of severity, and treatment selection in primary care for older adults presenting with pain (5).

A fundamental problem for the clinical assessment is that, despite advances in our understanding of the disease, there remains a discrepancy between structural markers of pathology and the clinical syndrome of osteoarthritis typified by joint pain, use-related stiffness and disability (6, 7). Such discrepancy has been noted in cross-sectional studies and longitudinal studies of the clinical course (8, 9, 10). In patients with osteoarthritis, associations between pain severity and disability and a variety of physical, psychological and socioenvironmental factors suggest the need to adopt a perspective that is broader than one based on pathophysiology alone (11-17).

The pain is a common presenting complaint with many possible causes. An awareness of certain patterns can help the family physician identify the underlying cause more efficiently. In knee pain, teenage girls and young women are more likely to have patellar tracking problems such as patellar subluxation and patellofemoral pain syndrome, whereas teenage boys and young men are more likely to have knee extensor mechanism problems such as tibial apophysitis (Osgood-Schlatter lesion) and patellar tendonitis. Referred pain resulting from hip joint pathology, such as slipped capital femoral epiphysis, also may cause knee pain. Active patients are more likely to have acute ligamentous sprains and overuse injuries such as pes anserine bursitis and medial plica syndrome. Trauma may result in acute ligamentous rupture or fracture, leading to acute knee joint swelling and hemarthrosis. Septic arthritis may develop in patients of any age, but crystal-induced inflammatory arthropathy is more likely in adults. Osteoarthritis of the knee joint is common in older adults (18).

Defining the clinical problem based on information from the clinical history and physical examination traditionally involves diagnosing disease. Criteria developed by the American College of Rheumatology (ACR) for the classification of hip, knee and hand osteoarthritis have provided definitions based on history and physical examination (19-21).

The usefulness of criteria such as the ACR clinical criteria for OA depends on the purpose for which they are required. The ACR criteria were developed to differentiate OA from other painful rheumatological conditions (4).

The other clinical criteria can be also used in primary care, although they have a low specificity. It could be necessary to establish new criteria to ameliorate the specificity and the handling of these patients in primary care, to avoid unnecessary explorations (22).

Traditionally, radiological changes have been considered the ‘gold standard’ for the diagnosis of OA. However, widespread radiological surveillance of the population is no longer ethically or economically appropriate. There is a growing body of literature that supports the use of clinical examination and history of joint pain for the diagnosis of OA in population surveys (23).

The proposals outlined factors that relate to perceived severity of the condition (need) and the possible barriers to consultation that might exist.

Barriers for the diagnosis of OA: (24)

- The high prevalence of negative attitudes to OA and available treatments
- Belief that joint pain is a part of the normal ageing process
- Resignation to pain and disability
- Fearful of painful examination and investigations
- Previous unsatisfactory experiences of relatives or friends
- Message that `nothing can be done' from the medical profession
- Plausible options offered by alternative practitioners

Within a regional pain syndrome approach, the process of diagnosis is limited to identifying serious pathology or other specific diseases and disorders.

Algorithms for the diagnosis of musculoskeletal complaints in primary care have been developed by combining reviews of available evidence and either consensus of practitioners or expert opinion (25). `Red flags' for regional pain presentations at the hip, knee or hand are summarized in Table 1. The purpose of these is to create a group of cases in which the probability of serious pathology or specific conditions other than osteoarthritis is higher than average (26). These red flags justify further diagnostic evaluation, referral and investigation.

Given the involvement of the whole joint in osteoarthritis and the co-existence of articular and peri-articular disorders, the identification of non-articular disorders may not be as straightforward as it would appear. After excluding such `red flags' and other specific diagnoses, the importance of other features and characteristics is judged by their ability to help us understand the nature and severity of the patient's problem, estimate its prognosis and formulate a management plan.

Table 1. Red flags for regional pain disorders of the hip, knee and hand.

Presentation	Red flag	Main diagnoses
Regional (hip, knee or hand)	History of significant trauma	Fracture
		Major soft-tissue injury
	Severe localized inflammation	Septic arthritis

Crystal arthritis (e.g. gout, pseudogout)
Traumatic arthritis
Bleeding disorder
Rare
Synovial disorders (foreign body, tumour)
Monoarticular presentations of polyarthritis

Although the study of hip pain presenting to general practice discussed earlier suggested that unilateral pain was the usual presentation in first time consulters, such cases are likely to be untypical of all patients with joint problems assessed in primary care.

Irrespective of the underlying disease, the presence of multiple pain sites is associated with increasing likelihood of significant disability and present additional challenges to the patient and clinician alike in its management. For the assessment of patients with the clinical syndrome of osteoarthritis the identification of multiple site pain is therefore important. It is less clear whether the division of this into OA sites and non-OA sites is clinically useful.

The presence of health conditions other than osteoarthritis is also common and age- related (27). Not all interactions, however, carry equal implications for the clinical assessment of patients presenting with joint pain. There is emerging evidence that certain co-occurring health conditions have a synergistic effect on patient disability (28).

The disparity between symptoms, disability and structural changes on X-ray exists at knee, hip and hand joints.

Current guidelines indicate a limited role for plain X-ray and MRI scans in the clinical assessment and management of osteoarthritis. Despite being superior for imaging soft tissue and early structural changes associated with osteoarthritis, MRI scans have yet to demonstrate value in routine clinical assessment, and financial implications may place restrictions on their use in such a common condition.

Table 2. Guidelines for imaging relevant to osteoarthritis

Clinical presentation	Type of imaging	Recommen - dation	Strength of Evidence*	Comments
Hip pain-full movement	Pelvic X-ray	Not indicated routinely	C	X-ray only if symptoms and signs persist or complex history
Hip pain– limited movement	Pelvic X-ray	Not indicated Initially	C	Symptoms often transient. X-ray if hip replacement might be considered
Knee pain-without locking or restriction of movement	X-ray	Not indicated routinely	C	Symptoms frequently arise from soft tissues and these will not be demonstrated on X-ray. OA changes common. X-rays needed when considering surgery
Knee pain-with locking, restricted movement or effusion (?loose body)	X-ray	Indicated	C	To identify radio-opaque loose bodies

*Strength of evidence was graded: C:expert opinion with endorsement of respected authorities.

Previous studies of the role of plain X-rays and MRI scans in osteoarthritis have seldom attempted to discriminate between the different reasons for ordering them and are therefore hard to interpret. These are not indications for the use of plain X-rays defended their actions citing several reasons:

- They were a useful aid to discussions about management with patients;
- Patient pressure and the need for reassurance were perceived as important determinants of an x-ray request;
- Normal radiographs helped avoid unnecessary referral to a specialist;
- Radiographs were a requirement for specialist referral;
- Medico-legal considerations.

The value of using X-rays for some non-diagnostic reasons can be openly challenged from existing research. Confirming severe radiographic disease before referral to an orthopaedic surgeon is an example. Priority criteria developed for primary hip and knee replacement are heavily weighted towards pain severity and the degree of functional limitation (29, 30).

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L039

PRACTICAL CLINICAL ASPECTS OF GAIT ANALYSIS

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L040

REHABıLıTATıON MEASURES ıN PREVENTıVE MEDICINE FOR HEALTHY PEOPLE

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This title covers a multidimensional approach to healthy people in order to prevent health. One dimension regards activity level and risks of sedentary life style and this may be the most known. Ergonomic approaches at home fascilities and professional enviroments are accordingly as important as the other dimensions in terms of avoiding from overuse injuries. Landscape and enviromental desing also should be regarded for not only handicapped but also for healthy people. When we're talking about healthy people we should use apparently healthy people instead. As we exit 20th century and entered 21st, many of us looking for a truly meaningfull life style change. That is why Quality of Life became more important in Rehabilitation Medicine than before. Coronary Artery Disease, Hypertension, Obesity, Stroke, some types of cancer, Osteoporosis and Diabetes are most known diseases which could be prevented by appropriate exercise programs, diet and life style modifications even sometimes without requiringany drug regimen.

Succesfull aging includes the ability to perform functional tasks and these are influenced by musculoskeletal and cardiovascular functioning and the presence of a severity of symptoms of chronic diseases. Some evidences of positive effects in this regard are are about encouraged by physical activity recommendations iclude engaging in cardiorespiratory, flexibility, strength and balance training 3-5 days per week. Broad nutritional recommandations for older adults include a low fat, plant-based, diet including fruits, vegetables, whole grains, 8 glasses of water per day, and a vitamin and mineral supplement.

Aerobic exercise training in apparently healthy people and in patients with metabolic syndrome can be useful as a treatment strategy as preventive measure and provides support for a role for physical activity in the prevention of chtonic diseases. For a successfull public health approach to chronic disease prevention we cannot rely completely on pharmaceuticals, but must implement enviromental changes to encourage healthy life style.

We are all aware of the risks of prolonged bed rest which can also be prevented by excercise. Stress and stress related diseases are one of the common questions leading the people to helth care centers. Treatment strategy to cope with this strategy also shopuld based on not only drug regimens but also some relaxation tecqhniques including exercise, yoga, music, taichi, etc. Promotion of social engagement may stil be important for this aim.

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L041

QUALITY OF CARE IN PRM PRACTICE

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Quality in health care should not be considered just a matter of applying views of experts or managers, but should be expanded to include the perceptions of patients and their families.

High quality services in PRM settings should be available for all patients, all over the world.

At present, there are unacceptable variations in the quality of Rehabilitation services, available to patients in need, in different countries. This situation has to change, because improving the quality and consistency of Rehabilitation services is an important part of:

[a] tackling inequalities in both health and access to care

[b] preventing or diminishing residual disabilities and

[c] improving the overall health of populations.

To achieve this, we need to meet the following objectives:

[a] To reduce inacceptable variations in Rehabilitation practice in different countries.

[b] To improve the standards of Rehabilitation care

[c] To ensure the best use of resources so that patients receive the greatest benefit.

The development of international guidelines, (based on reliable evidence of clinical and cost-effectiveness, on the experience of Rehabilitation professionals and Managers, and on the values and wishes of patients and their families) will be an essential part of achieving these objectives.

A professionally led multinational project must be designed with the following objectives:

1. To investigate the methods by which relevant and useful information can be collected and compared
2. To support Rehabilitation services of different countries in the process of evaluating and comparing quality of their care of patients.
3. To develop and disseminate evidence based review criteria.

Through data collection, comparison and feed-back relating to appropriate evidence-based review criteria, national Rehabilitation Teams will be able to compare their own standards of care, with those of similar practices in equivalent populations from different countries. These criteria will support PRM specialists in making decisions about implementing more effective Rehabilitation practice. Standards must not be set by the project, since local circumstances, such as the availability of resources, in different countries, may have a critical role in the extend to which improvements in process and outcome care will be achieved.

In the long term, such a project should be developed to a quality assurance system, aiming to improvement of patient's Rehabilitation care and more effective management on an international basis.

L042

OUTCOME MEASUREMENTS IN REHABILITATION

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The outcome of medical and other therapeutic interventions can be considered within a two-dimensional taxonomy, bounded on the one hand by the International Classification of Functioning, Disability and Health (ICF), and on the other by the nature of the measurement instrument. Thus the consequences of disease or injury can be considered within the impairment, activity limitation and participation structure, previously understood to be health status. In addition, the perception of quality of life can be considered as a subjective response to the impact that these domains have upon subjective well-being or life satisfaction. Forming the rows of the matrix, health status and quality of life can be measured by outcome instruments which are designed according to different principals and range from professional-directed to patient-directed outcomes which form the columns of the matrix.

Although not exclusively so, the dominant pattern of the matrix is for a top-left to bottom right emphasis. Thus objective measures of impairment such as grip strength or range of movement are developed by basic scientists or engineers, and administered by professionals. The measurement of functional impairments such as pain or fatigue are developed by professionals and are self completed by patients, as are many measures of activity limitation and participation restriction. Many modern quality of life instruments are developed through a process involving patients either in focus groups or qualitative interviews, where their statements are then used to form self-completed questionnaires. Finally, patient-directed outcomes have attempted to move the patient involvement to the point where no previously validated scale is on offer, rather a process of negotiation with patients about, for example, their goals for rehabilitation, or the aspects which they consider important for their quality of life. They can be considered to be individualised outcome measures, relevant for that patient.

In practice, outcome measurement in rehabilitation is dominated by impairment-activity limitation focused professionally-led measurement. A recent European study (PRO-ESOR), highlighted the dominance of such measures in different diagnostic groups. For example, a default current core-set of outcome measures could be defined for the neurosciences, and included impairment measures such as the Mini Mental State Exam (MMSE) and the Rivermead Behavioural Memory Test, along with activity limitation instruments such as the Functional Independence Measure (FIM™), and the Barthel Index. Few widely used measures for participation or quality of life were identified.

Other than a few measures of impairment such as range of motion or grip strength, all outcome measures in rehabilitation deliver ordinal scaling. Thus the calculation of change scores or effect sizes is invalid for these types of instrument. However, modern psychometric theory approaches are bringing about a paradigmatic shift in the quality of measurement on offer. New instruments are being developed which can deliver interval scaling. Furthermore, these scales will form the basis of construct-specific item banks which will facilitate Computer Adaptive Testing and revolutionise outcome measurement for the 21st century.

L043

OCCUPATIONAL THERAPY FOR THE COMPLETION OF AN INDIVIDUAL REHABILITATION PROGRAM

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Introduction

Occupational therapy is a branch of retraining medicine that was started in Europe in the period between the two World Wars, becoming organized in the main European countries in the 1950s and 1960s and which is now attracting great interest and attention because of its philosophy of considering the person as a whole.

In Italy occupational therapy activities were started in about the 1960s and the Italian Association of Occupational Therapy was founded in 1977. In the same period the Italian Society of Physical Medicine and Rehabilitation (SIMFER) was creating working groups and study groups on these themes. Finally, in the 1990s this sector of rehabilitation was enriched and amplified by input from ergonomic-type approaches which give particular prominence to an

integrated global approach to the prevention and rehabilitation of most the musculoskeletal disease connected with working activities. A modern definition of occupational therapy indicates this as the rehabilitation discipline dealing with learning and relearning daily life activities, in pathological situations. Its principle objective is maximum recovery of autonomy and independence, aimed at the greatest possible re-integration of the disable person into family, social and working life.

Defined in this way, occupational therapy thus seems to the branch of health care that comes closest to the concepts outlined in the recent International Classification of Functioning, Disability and Health (ICF) of the WHO, which focuses on the person as a whole and on particular aspects of functioning and participation.

Ergotherapy has taken on the role not only of treating functional disorders, but also of caring for all those human manifestations altered by the presence of any psychological, sensory or motor disorders. The particular aim in motor disturbances is movement retraining, while in mental disorders the retraining is concentrated on expression; finally, the main aim of occupational therapy in severely disabled people is restoration of self-sufficiency. Ergotherapy is exactly that: - a therapy: it must, therefore, have precise, reasoned medical indications that are limited in time and above all specific.

The situation in Italy

In Italy, occupational therapy is particularly targeted to patients with profound levels of disability, for example patients with spinal cord lesions, severe head injuries, Parkinson's disease, amyotrophic lateral sclerosis, severe complex trauma, hemiplegia, multiple sclerosis, polyneuritis, limb amputations, rheumatoid arthritis, polyarthroses, and many other conditions. Furthermore, numerous activities are specifically indicated for children (for example, those with permanent sequelae of infantile cerebral paralysis) and the elderly with cognitive and/or motor disabilities.

These activities are predominantly carried out in health care structures and in institutes for the elderly, although much work is being undertaken to make these services operative also in the patients' home.

The main aims of occupational therapy include:

- specific kinesiotherapeutic treatment for the recovery of physical functions and to increase joint mobility, muscle strength, resistance and co-ordination, through targeted activities;
- training in personal autonomy and in daily life activities (eating, hygiene, dressing, etc.);
- the study and training of compensatory mechanisms in cases of irreversible disability;
- the design and application of prostheses, aids and adapted utensils in cases of particular motor disabilities;
- adaptation of domestic and working activities aimed at maximum recovery of the person's residual capacities;
- adaptation of domestic and working environments, planning to eliminate architectural barriers and proposing appropriate and realistic solutions for the disabled person;
- evaluation aimed at quantifying the potential and residual physical and mental capacities of the person, social adaptation, interests and possible return to work;
- possible re-orientation towards new recreational interests and work.

All this must be integrated in the context of proposed specific retraining programs, quantitative criteria of functional evaluation, compatibility between capacities and tasks, ergonomic criteria for return to work, and so on.

An occupational therapy intervention normally has three stages: evaluation, achieving self-sufficiency, re-insertion.

The evaluation consists of a detailed analysis of the existing level of self-sufficiency and summarizing this in appropriate scales of functional evaluation. The literature presents numerous scales created specifically for this purpose, such that current efforts are now directed at choosing and validating the better ones: examples are the traditional Barthel's index, the "Klein-Bell activities of daily living scale", the ICIDH-WHO scale, the FIM, etc. These are generally evaluation scales composed of "items" which investigate fundamental activities: eating, hygiene, dressing, sphincter control, mobility, locomotion, communication, relational and cognitive abilities. Each "item" is attributed a numerical value which indicates the person's level of "dependence" or "performance". These scales are fundamental for quantifying the *outcome* of the intervention performed.

The aim for severely disabled people is to achieve self-sufficiency in daily life activities. A precise "retraining program" is designed to include all the main functions: environmental control in bed, eating, hygiene, dressing, movements, possible use of a wheelchair and so on. In order to achieve this, specific motor recovery (or compensation) exercises are carried out. These exercises bring the individual to the maximum autonomy possible. The program then continues by concentrating on activities of movements and transfer, perhaps including use of a wheelchair, up to possible recovery of an upright posture and walking.

The third stage, that of re-insertion, involves various types of training and has multiple targets, such as relearning the skills necessary for managing the household (using simple methods aimed at minimizing energy expenditure), technical consultation regarding the prescription and assignment of aids, analysis of any employment possibilities and occupational interests, evaluation of the domestic and working environment (in order to suggest possible changes to architectural barriers), evaluation of the ability to drive a motor vehicle and the related specific training.

There are currently 5 university courses for occupational therapists in Italy. These courses are offered at the Universities of Milan, Pavia, Rome and Pisa. These courses last three years and cover a broad range of subjects: anatomy, physiology, clinical orthopedics, neurology, rheumatology, kinesiotherapy, occupational therapy techniques, ergonomics, marketing and foreign languages, etc.

Concluding remarks and prospectives

The activities of occupational therapy complement and complete rehabilitation treatment, maximizing the efficiency of this latter with respect to reaching the highest possible levels of autonomy, self-sufficiency and thus Participation and Health.

The concept of an Individual Rehabilitation Program as a guide and at the same time as an objective of care, can only have become a concrete reality if a final, conclusive approach of this type is used: this sort of approach is also a synthesis of rehabilitation and a strong connection between the difference services and interventions directed at the final goal. It is not merely by chance that there are more occupational therapists than physiotherapists in the rehabilitation system in the USA.

The philosophy of the very recent ICF classification can also be discerned in that of occupational therapy; in fact, when the basic outline of the ICF is compared with that showing the outcome goals of occupational therapy it can be seen that the aims of the latter are targeted precisely at the aspects of human life that the ICF also identifies as fundamental. The table below shows that there are numerous, important analogies between the two approaches.

ICF	**OCCUPATIONAL THERAPY (AJOT 2002)**
ACTIVITES AND PARTICIPATION	PERFORMANCE IN AREAS OF OCCUPATION

Learning and applying knowledge General tasks and demands Communication Mobility Self-care Domestic life Interpersonal interactions and relationships Major life areas Community, social and civic life	Activities of Daily Living (ADL) Instrumental Activities of Daily Living (IADL) Education Work Play Leisure Social Participation
	PERFORMANCE SKILLS
	Motor Skills Process Skills Communication/Interaction Skills

Very important work is currently being carried out in Europe around the ICF and in defining applicative instruments (the so-called "*ICF Core Set*") which consist of the set of items considered to have priority in various disabling conditions.

In fact, there is a very strong and significant connection between these activities of constructing shared ICF instruments and the working methods of rehabilitation activities. Indeed, only areas of occupational therapy and performances can act as targets and measurement parameters.

Finally, we agree with the recently published statement that the ICF "*can serve as a useful tool for occupational therapists and support communication between professions*" (Haglund, 2003) even if the specific evaluation of rehabilitation and of occupational therapy conserve all their validity. Indeed, these latter "*should be used as complements to the ICF*" (Haglund, 2003).

It is therefore to be hoped that work and groups will continue this fundamental line of research, leading to the creation of practical, useful, efficient and shared (at least in Europe) research instruments. The international medico-scientific societies such as the Mediterranean Forum could make the specific and particular commitment to hasten the spread and ingrain the importance of this aspect as quickly as possible: both in order to increase its formation and to include it in the activities for qualifying rehabilitation services in different countries.

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L044

EPIDEMIOLOGY OF OSTEOPOROSIS

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Osteoporosis is a major health problem and currently defined as a systemic skeletal disorder characterized by low bone mass and microarchitectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture. Clinically, osteoporosis is recognized by occurrence of characteristic low-trauma fractures, which typically arise at the hip, spine, and distal forearm. Around %20 of all postmenopausal women in Western countries would meet the WHO criteria for osteoporosis, around 1.3 million fractures in United States each year are attributable to the disorder. It is estimated that around 40% of all US white women and 13% of US white men aged 50 years will experience at least on clinically apparent fragility fracture in their lifetimes. However taking into account sites other than the hip, spine, and distal forearm, the lifetime risk among women aged 50 years might be as high as 70%. Estimates for the British population are around 20% lower. Fracture incidence in the community is bimodal, with peaks in youth and in the very elderly. In young people, fractures of the long bones predominate, usually after substantial trauma, more frequently in males than females.

Over the age of 35years, overall fracture incidence in women climbs steeply, so that rates become twice those in men. Hip and distal forearm fractures are the main contributors to this later peak, which also includes proximal humeral, pelvic, and proximal tibial fractures. Incidence rates increase with age; rates are higher among women than men, and fracture is associated with moderate trauma at sites containing large amounts of trabecular bone.

In most populations, hip fracture incidence rates increase exponentially with age. Above 50 years of age, there is a female to male incidence ratio of approximately two on one. 98% of all hip fractures occur among people aged 35 years and above, and 80% occur in women. Femoral neck bone strength declines with age in both sexes and is less in women than men. Over a lifetime, BMD if the femoral neck declines an estimated 58% in women and 39%in men, while BMD of the intertrochanteric region of the proximal femur falls about 53% and 35% in women and men, respectively. Most hip fractures occur following a fell from standing height or less in men or women with reduced bone strength. The risk of falling increases with age and is higher in elderly women than elderly men. The majority of hip fractures occur indoors and not as a result of slipping on icy pavements. Therefore, it is hypothesized that the seasonality may be due to hypothermia impairing neuromuscular coordination, or wintertime deficiency of sunlight and vitamin D. Incidence rates vary substantially from one population to another. Hip fractures occur less frequently in nonwhites than whites, there are differences within populations of a given gender or race. In Europe, hip fracture rates vary more than 7-fold from one country to another. These variations imply an important role of environmental factors in the incidence of hip fractures.

The epidemiology of vertebral fractures has proved difficult for two reasons. Firstly, a significant proportion of vertebral fracture are asymptomatic, and radiographic surveys of the general population are required to generate valid estimates of prevalence. There has

been difficulty in achieving consensus as to the definition of vertebral deformities from lateral thoracolumbar radiographs. In the European Vertebral Osteoporosis Study (EVOS), 15 570 men and women aged 50-79 years were enrolled from population registers in 36 countries. The overall prevalence morphometrically defined vertebral deformity in men and women was %12. The prevalence increased in both sexes with age, but curve was steeper in women. This study suggests an annual incidence for new radiographic vertebral deformities of around %1 among women aged 65 and 0.5% among men of same age. There was evidence of geographic variation in the incidence of radiographic vertebral deformities, with higher rates in Scandinavia.

Incidence rates for clinically diagnosed vertebral fractures have also been obtained in North America and Europe, in Rochester, Minnesota, the incidence of clinically ascertained vertebral deformities was around 30% of the rate for all radiographic deformities, suggesting that around 1 in 3 incident deformities come to clinical attention.

Distal forearm fractures almost always follow a fall on the outstretched arm. In white women, incidence increases linearly from age 40 to 65 years; thereafter, the rate of increase is less pronounced. In men, incidence remains constant between age 20 and 80 years. Consequently, the majority of distal forearm fractures occur in women (age-adjusted female to male ratio of 4 to 1) and around one half occur among women aged 65 years and over. It may be related to a change in the pattern of falls with advancing age, perhaps due to a slower gait or a loss of neuromuscular protective reflexes. There is a winter peak in distal forearm fracture incidence,(17) but the winter peak in wrist fractures is more pronounced and more clearly related to falls outdoors during periods of icy weather. In recent studies, the apparent plateau in female incidence rates with advancing age shows marked attenuation; distal forearm fracture rates continue to rise in women between ages 65 and 80 years, albeit with age-related increase that is not as steep as that observed for hip fracture.

The incidence rates of proximal humeral, pelvic, rib, clavicular, and scapular fractures also rise steeply with age, and are greater in women than men.

Epidemiological studies suggest that patients with different types of fragility fractures are at increased risk of developing other types of fracture. The presence of a previous vertebral deformity leads to a 7-fold to 10-fold increase in the risk of subsequent vertebral deformities. Data from Rochester, Minnesota, suggest that the risk of a hip fracture is increased 1.4-fold in women and 2.7-fold in men after the occurrence of a distal forearm fracture. Vertebral fractures were significantly increased at all ages after a distal forearm fracture:5.2-fold in women / 95% confidence interval (CI) 4.5-5.9) and 10.7-fold in men (95% CI 6.7-16.3). Similarly, people with radiologically diagnosed vertebral deformities have an increased risk of limb fracture over subsequent follow-up.

There are considerable geographical variations in the age-standardized and sex-standardized discharge rates after hip fractures in the UK and in the US. In the UK, the variation could not be explained by differences in water fluoride content or by dietary differences in water fluoride content or by dietary consumption of calcium. In the US, there is north south gradient of fracture risk with a cluster of high incidence in the southeast. An association was detected between hip fracture incidence and southerly latitude, socioeconomic deprivation, proportion of agricultural land, reduced sunlight exposure, and soft, fluoridated water supply. Differences in body weight, smoking, and alcohol consumption do not reveal parallel geographic trends.

Hip fracture rates are higher among whites than among blacks. Within black population, both in South Africa and in North America, rates in men and women are similar. The highest recorded rates of hip fracture, after age-adjustment, come from Sweden and the northern US. Rates in southern Europe and Israel are substantially lower, and there is a convergence of female and male rates. The reasons for these ethnic patterns are uncertain, but: 1-bone density appears to be greater in blacks than whites during middle life, 2-blacks may manifest a greater resistance to the bone resorptive effects of parathyroid hormone and 1,25 dihidroxyvitamin D3, and 3-body composition studies in black women report greater muscle and fat mass, suggesting a possible reduction in fractures through a reduction in the likelihood and severity of falls in later life.

Survival rates 5 years after hip and vertebral fractures were found in Rochester, Minnesota, to be around 80% of those expected for men and women of similar age without fractures. Mortality after Colles' fracture is not thought to deviate from the expected rate. Hip fracture mortality is higher for men than for women, increases with age, and is greater for those with coexisting illnesses and poor pre-fracture functional status. Excess mortality after vertebral fracture appears to increase progressively after diagnosis of the fracture. Survival at 5 years appears to be worse for men (72%) than for women (84%).

L045

NEW TRENDS IN THE MEDICAL TREATMENT OF OSTEOPOROSIS

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Osteoporosis is defined as a skeletal disorder characterized by compromised bone strength predisposing to an increased risk of fracture. Bone strength reflects the integration of two main features: bone density and bone quality. Bone density is expressed as grams of mineral per area or volume and in any given individual is determined by peak bone mass and amount of bone loss. Bone quality refers to architecture, turnover, damage accumulation (e.g., microfractures) and mineralization. A fracture occurs when a failure-inducing force (e.g., trauma) is applied to osteoporotic bone. Thus, osteoporosis is a significant risk factor for fracture, and a distinction between risk factors that affect bone metabolism and risk factors for fracture must be made.

The goals of treatments are to prevent bone loss before osteopenia becomes evident, to decrease fracture risk in subjects who already have reduced bone mass, to minimize the risk of further fracture in patients with osteoporotic fracture, and finally to minimize the symptoms of osteoporotic fracture and its consequences-to alleviate pain, increase mobility and minimize depression.

Various nonpharmacological measures can reduce the risk of developing postmenopausal osteoporosis that should be recommended to all women, including adequate exercise, a diet rich in calcium and vitamin D, to stop smoking and avoiding excessive alcohol intake.

For the aim of reducing or minimizing fracture risk, two main groups of drugs can be used today. These are:

Antiresorptive agents: Calcium and Vitamin D, Hormone Replacement Therapy, Tibolon, Selective Estrogen Receptor Modulators, Bisphosphonates, Calcitonin.

Bone-forming agents: Parathyroid Hormone, Strontium Ranelate.

Calcium, Vitamin D, Calcitonin and Alendronate,Risedronate from Bisphosphonates group which have been used today are not included as the new and research treatments of osteoporosis in this article.

Antiresorptive Agents

Hormone Replacement Therapy (HT): According to European Menopause And Andropause Society (EMAS) statements on postmenopausal hormonal therapy ;

• In women with climacteric symptoms, HT of any type provides symptom relief with no alternative treatment of similar effect. This treatment positively affects quality-of-life. The dose and regimen of

HT need to be individualized and in general the appropriate dose is dependent on the menopausal age.

• Current data support an overall beneficial risk benefit ratio of HT in women with natural or iatrogenic premature menopause.

• Urogenital symptoms due to atrophy can alternatively be treated with local low-potency/dose estrogens, for which systemic risks have not been identified.

• There is good evidence that current use of HT (ETand EPT) reduces the relative risk of osteoporotic fractures regardless of the presence or absence of risk factors.

• HT increases risk of breast and endometrial cancer.

• According to the recent RCT studies HT should not be prescribed as CHD prevention. Epidemiological data provide evidence of an increased risk of VTE, in particular during the first years of treatment and a slightly increased risk of ischemic stroke independent of age and treatment duration.

• There is insufficient evidence of a beneficial effect of HT on cognitive function or risk of dementia. HT should not solely be prescribed for these purposes.

New Bisphosphonates: *Ibandronate, Zoledronate and Pamidronate*

Ibandronate: [1-hydroxy-3-(methylpentylamino) propylidene] bisphosphonate, currently in phase 3 development for the treatment of postmenopausal osteoporosis. The first study demonstrates for the significant fracture efficacy for intermittent bisphosphonate treatment with a dose-free interval of more than 2 months. Oral ibandronate was compared with placebo in 2946 women who had BMD T-score < -2.0 in at least 1 lumbar vertebra and 1 to 4 prevalent vertebral fractures. Two dosage regimens of ibandronate, either given daily (2.5 mg) or on alternate days for 12 doses every 3 months (20 mg), for 3 years, were investigated. Daily and intermittent oral ibandronate significantly reduced the risk of radiologically confirmed vertebral fractures by 62% and 50%, respectively, compared with placebo and showed a sustained effect over the trial period. Significant reductions in clinical vertebral fractures were also shown in the 2 treatment groups. After three years, ibandronate reduced the relative risk of new vertebral fractures by 62% and 50% for the daily and intermittent groups, respectively.Overall, there was no statistically significant decrease in the incidence of nonvertebral fractures, a secondary study outcome. However, in a higher risk subpopulation (femoral neck BMD T-score<3.0)both regimens reduced the risk of all clinical fractures and non-vertebral fractures(range of risk reduction 37-69%).

Oral once-weekly ibandronate (20 mg) and daily administration of ibandronate (2.5 mg) induced almost identical increases in lumbar spine BMD after 48 weeks, and the once-weekly regimen was proven to be statisticially noninferior to daily administered oral ibandronate. At the result of the study, the compliance of the patients for oral once-weekly ibandronate will be induced. Three-monthly (2 mg) intravenous ibandronate bolus injections were related to even larger increases of lumbar spine BMD after 1 year (5%). Significant benefits were also reported at the femoral neck or at the trochanter.

Zoledronate: In a similar prospective study assessing the effects of the dose and dosing interval on changes in therapeutic effects of bisphosphonates, zoledronate was evaluated in a 1-year randomized controlled trial of 351 postmenopausal women with low BMD. Women received placebo or intravenous zoledronic acid in doses of 0.25 mg, 0.5 mg, or 1 mg at 3-month intervals. In addition, 1 group received a total annual dose of 4 mg as a single dose, and another received 2 doses of 2 mg each, 6 months apart. Similar increases in BMD were recorded in all the zoledronic acid groups to values for the spine that were 4.3% to 5.1% higher than those in the placebo group and values for the femoral neck that were 3.1% to 3.5% higher than those in the placebo group, suggesting that an annual infusion of zoledronate might be an effective treatment for postmenopausal osteoporosis. [1-hydroxy-2-(1H imidazole-1-yl) ethylidene] bisphosphonate which is also currently in phase 3 development for the treatment of postmenopausal osteoporosis.

Pamidronate: Intravenous pamidronate (3-amino-1-hydroxypropylidene-1, 1-biphosphonate (APD)) is of proven value in the management of multiple myeloma, metastatic breast cancer and symptomatic Paget's disease. There has not been a large multicentre clinical trial of i.v. APD with fracture reduction as an end-point. However, there have been some small studies demonstrating the efficacy of i.v. APD in increasing bone mineral density (BMD) in postmenopausal women with osteoporosis and also in glucocorticoid-induced osteoporosis. According to Chan et al study, Intermittent APD increases BMD and may be a suitable alternative for patients who cannot have oral bisphosphonates.

***Selective Estrogen Receptor Modulators*:** Arzoxifene, bazedoxifene, lasofoxifene, MDL-103,323 and ospemifene are investigational selective oestrogen receptor modulators shown to be effective in animal studies and are now in clinical studies.

Bone-Forming Agents

***Parathyroid Hormone(PTH)*:** Antiresorptive drugs may be associated with an increase in bone density by reducing the remodeling space and by prolonging the duration of mineralization. The concept of anabolic agent is based upon a physiologic process entirely different from inhibition of bone resorption, namely stimulation of bone formation. PTH is the potential for anabolic agent, to increase bone mass for to a far greater extent than antiresorptives. The largest randomized, placebo-controlled trial to date, by Neer et al, tested daily administration of 20 or 40 μg of subcutaneous hPTH(1-34) in 1637 women with postmenopausal osteoporosis. Median follow-up was 21 months. For the two doses of PTH, spine BMD increased 10-14%. Femoral BMD also increased by approximately 3%.Total body BMD increased significantly as well. Compared with placebo, PTH reduced the risk of one or more new vertebral fractures by 65% and 69%, respectively. Among the women with the new vertebral fractures, the mean loss in height was greater in placebo group than PTH groups. PTH therapy also increase in bone mineral density osteoporosis in men. Because of the occurrence of osteosarcoma in rats treated with very high doses of teriparatide, the duration of treatment is limited to 18 months in European Union and 24 months in the USA. Teriparatide is administered as a daily subcutaneous injection in postmenopausal women and men osteoporosis at high risk of fractures.

Strontium Ranelate (SR): is a new orally active agent consisting of two atoms of stable strontium and an organic moiety(ranelic acid). It stimulates the formation of new bone tissue and decreases bone resorption. To evaluate the efficacy of SR in preventing vertebral fractures in a phase 3 trial, randomize assigned 1649 postmenopausal women with osteoporosis and at least one vertebral fracture to receive 2gr/day oral SR or placebo for three years. All patients received calcium and vitamin D supplements before and during study. Vertebral radiographs were obtained annually and measurement of bone mineral density were performed every six months. SR increased bone mineral density at month 36 by 14.4% at the lumbar spine and 8.3% at the femoral neck ($p<0.001$ for both comparisons). At the end of three years of treatment, there was 41% lower risk of new vertebral fracture in SR group than the placebo group. There were no significant differences between the groups in the incidence of serious adverse events. None of the biopsies showed evidence of osteomalacia or any sign of a primary mineralization defects.

The TROPOS (Treatment Of Peripheral Osteoporosis) was a randomized, double-blind, placebo controlled, phase III study involving 5091 postmenopausal women from 12 countries. The main objective was to assess the efficacy of SR 2g/d taken orally during 3 years or more on new nonvertebral fractures. A secondary endpoint

was the femoral neck BMD change. SR significantly reduced the incidence of patients with new nonvertebral fracture, in the ITT population (RR: 0.84, p=0.05). The reduction of the risk by 33% was also significant (p<0.001) on the incidence of patients experiencing a new nonvertebral fracture in the minimal exposed data set. A 41% reduction in the relative risk of experiencing a hip fracture was also demonstrated in the minimal exposed data set. Femoral neck BMD was also (p<0.001) increased in the SR group with 6.54% relative change from baseline as compared to placebo.

Statin: Laboratory studies, both in vitro and in mice, have shown that statin medications stimulate bone formation through increasing the synthesis of bone morphogenicprotein-2. This activity was attributed to HMG-CoA reductase inhibition since addition of mevalonate, a downstream metabolite of HMG-CoA, blocked new bone formation. There has been progress in determining the intermediate steps that involve inhibition of prenylation, increased endothelial nitric oxide synthetase expression, and blocking of Rho activity. Statins can also inhibit osteoclast function and may reduce bone resorption. However, some of the studies found that statin halved the fracture risk, some of them found no such effect. Data are still mixed on whether statins reduce fracture incidence in humans. Prospective randomized controlled trials need to have better exclude the possibility of unmeasured confounding variables and to delineate precisely the role of statins in skeletal health.

Osteoprotegerin (OPG): Bone remodeling is the process in which bone is broken down by osteoclasts and then built back again by osteoblasts. In healthy adult bone, these two processes are balanced and a constant level of bone mass is maintained. Some of the proteins involved in the interaction between osteoblasts and osteoclasts have recently been identified. Receptor activator of nuclear factor-kappaB (RANK) ligand is produced by osteoblasts and exerts its effects through binding to its receptor (RANK) on osteoclast precursor cells. Binding results in activation of osteoclasts. Osteoblasts also produce osteoprotegerin, a potent inhibitor of osteoclast formation and a decoy receptor for RANK. The relative ratio of OPG and RANK ligand in the bone marrow microenvironment may determine the number of active osteoclasts, bone resorption rate, and bone mass. OPG is currently under investigation for osteoporosis treatment.

Growth hormone (GH): GH secretion decreases naturally with aging and there is evidence that the GH–insulin-like growth factor (IGF)-I axis plays an important part in the maintenance of bone mass in adults, in addition to longitudinal growth of bone in children. Decreased bone mineral density is reported in adults with GH deficiency, in whom GH replacement treatment results in increases in bone turnover and BMD. There is an increased fracture risk in adult patients with GH deficiency, presumably as a result of the GH deficiency alone, rather than of other pituitary hormone deficiencies or their replacement. However, controversy exists as to whether GH treatment would increase BMD in patients with senile osteoporosis. Eighty osteoporotic, postmenopausal women, 50-70 years of age, with ongoing estrogen therapy (HRT), were randomized to recombinant human growth hormone (GH), 1.0 U or 2.5 U/day, subcutaneous, versus placebo. This study was double-blinded and lasted for 18 months. The placebo group then stopped the injections, but both GH groups continued for a total of 3 years with GH and followed for 5 years. Calcium (750 mg) and vitamin D (400 U) were given to all patients. Bone mineral density and bone mineral content were measured with DXA. At 18 months, when the double-blind phase was terminated, total body bone mineral content was highest in the GH 2.5 U group (p = 0.04 vs. placebo). At 3 years, when GH was discontinued, total body and femoral neck bone mineral content had increased in both GH-treated groups (NS between groups). At 4-year follow-up, total body and lumbar spine bone mineral content increased 5% and 14%, respectively, for GH 2.5 U (p = 0.01 and p = 0.0006 vs. placebo). Femoral neck bone mineral density increased 5% and bone mineral content 13% for GH 2.5 U (p = 0.01 vs. GH 1.0 U). At 5-year follow-up, no differences in bone mineral density or bone mineral content were seen between groups. Bone markers showed increased turnover. Three fractures occurred in the GH 1.0 U group. No subjects dropped out. Side effects were rare. In conclusion, bone mineral content increased to 14% with GH treatment on top of HRT and calcium/vitamin D in postmenopausal women with osteoporosis. There seems to be a delayed, extended, and dose-dependent effect of GH on bone. Thus, GH could be used as an anabolic agent in osteoporosis.

Leptin: Leptin has recently been implicated in bone homeostasis. It is a polypeptide hormone that is produced and secreted primarily by adipocytes. The role of leptin in body weight regulation is mediated by interactions with specific receptors located in hypothalamus. Leptin also implicated in the control of reproduction, obese mice deficient in leptin or its receptor are also hypogonadic and exhibit hypercortisolism, conditions that would be predictive of reductions in bone mass. However it has been shown that leptin deficient and leptin receptor deficient mice there is abnormally high bone mass due to increased bone formation. The high bone mass was not due to obesity and could be corrected in leptin deficient and leptin receptor deficient mice, by central infusion of leptin at doses that did not result in the presence of leptin in blood. The effects of leptin administration compared with estrogen therapy on ovariectomy-induced bone loss in rats. Leptin was effective at reducing trabecular bone loss, trabecular architectural changes, and periosteal bone formation. Interestingly, the combination of estrogen and leptin further decreased bone turnover compared with that in estrogen-treated ovariectomized rats. Leptin also significantly increased osteoprotegerin mRNA steady state levels and protein secretion and decreased RANK ligand mRNA levels in human marrow stromal cells *in vitro*. The study findings suggest that leptin could modulate bone remodeling in favor of a better bone balance in rats.

Other agents, with unique mechanisms of action in early development include cathepsin K inhibitors, integrin receptor inhibitors, vitronectin receptor antagonists, estren, the interleukin-6 and gp130 system, cytokines nitrosylated non-steroidal anti-inflammatory agents and Src inhibitors, calcilytic release of PTH.

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L046

DIAGNOSTIC METHODS IN OSTEOPOROSIS

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L047

OSTEOARTHRITIS: THE LEADING ROLE OF PRM

"Let's put some muscle in OA"

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Osteoarthritis (OA) is one of the most prevalent and disabling chronic musculoskeletal conditions affecting the elderly and a significant public health problem, especially in the aging societies. The most prominent feature of OA is the progressive destruction of articular cartilage resulting in pain, impaired joint motion, and disability. The etiology of OA is still largely unknown.

Osteoarthritis is a disorder of the joint as an organ, with all the tissues involved in the maintenance of functional stability. Cartilage, tough accepted as the key tissue to fail in OA is now being questioned as the initiating factor. The role of biomechanics in the initiation and progression of OA is also discussed. Connective tissue metabolism responds to mechanical force. Different kinds of stress create different connective tissues. The nature and quality of these responses are biologically mediated. A change within one tissue structure will cause others to respond biochemically to maintain a biomechanical balance. OA can be considered as a biomechanically driven-biochemically mediated disorder, In this context, relative contribution of these factors to initiation and progresion of OA should be defined (2).

The development and maintenance of articular structure and mechanical characteristics are tied directly to the effect of mechanical loading on the biology of cartilage cells and extracellular cartilage matrix. Because of the importance of cartilage health in maintaining mobility and the quality of life of individuals, there is considerable research into biology and mechanical characteristics of articular cartilage. There is also a research focus on the role that mechanical loading has on cartilage biology, an area that can be broadly referred as "cartilage mechanobiology" (3).

Despite all the experimental evidence, the relationship between tissues' stress-strain states and the corresponding adaptive or degenerative biological responses remains unknown (4).

Disorders of the neuromusculoskeletal system are one of the major pathological medical conditions addressed by the P&RM physicians, joint being one of the organs, mobility being the function of this system. Mechanics; both statics and dynamics are the physical laws this discipline gains important insights into the nature of this system. In this context OA is one of the main topics in P&RM. Physicians in this field use many physiotherapy and rehabilitation techniques to treat OA efficaciously. Management of the patient with OA is directed towards pain control, improvement in function and health related quality of life, with avoidance of toxic effects of therapy. The components of therapy are nonpharmacologic modalities and drugs. The nonpharmacologic modalities; education, exercise programs, assistive devices, appropriate footwear, ergonomics for joint protection and energy conservation are all based on improvement and/or correction of biomechanics (5). Pharmacologic agents should be considered as an addition to these nonpharmacologic measures. Physical therapy modalities such as thermal agents, ultrasound, electromagnetic fields, lasers are also widely used in OA. There is large amount of data about the effects of pharmacological therapies on cartilage metabolism and degeneration/regeneration process. On the other hand, the data about the effects of biomechanical and physical modalities on cartilage metabolism is inadequate or insufficient, the existing data largely being based on the symptomatic effects.

Can the role of mechanics and physical modalities on cartilage biology be a well-deserved research perspective in the field of P&RM ?, this question will be discussed.

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In order to fully understand the relationship between joint adaptation/degeneration and joint loading should know the following in the ideal case: 1. the instantaneous stress-strain state of all joint tissues for normal, everyday movement tasks; 2. the corresponding biosynthetic short-term and long-term adaptive responses of these tissues; and 3. the short- term and long-term adaptive responses of in-vivo joint tissues to altered loading conditions. It should be kept in mind that the biosynthetic response mechanisms of biological tissues continuously change as a tissue adapts to new loading conditions.

Osteoarthritis can be defined as mechanically induced joint failure, characterized by the biological response to the altered mechanics.

Mechanics Statics Dynamics
Deformation of cells and the surrounding matriks
Hydrostatic pressure
Fluid flow
Streching
Streaming potentials
Changes in pH
Osmotic pressure
Shear force
Vibration

L048

INTRA-ARTICULAR INJECTIONS OF CORTICOSTEROIDS AND HYALURONIC ACID: EVIDENCE-BASED?

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Corticosteroids and hyaluronic acid are the most frequently used intra-articular (IA) therapies in osteoarthritis (OA) of peripheral joints. Corticosteroid is a fast-acting symptomatic drug in OA. The aim of the IA steroid injection is to obtain the disappearance of joint effusion when this persists despite treatment combining limitation of joint activity and intake of NSAIDs. Due to the short-lived effect of IA steroids in both knee and hip joints,the frequent need for repeated injections limits the usefulness of this treatment in the long-term management of OA.

Glucocorticoid treatment induces the synthesis of lipocortin, which inhibits the enzyme phospholipase A2. Arachidonic acid release from membrane phospholipids is blocked and the production of proinflammatory substances via cyclooxygenase and lipoxygenase is reduced.

Various side-effects may occur after corticoid injections: post-injection flares, atrophy of the skin and subcutaneous tissues, dermal pigmentation changes, systemic effects, osteonecrosis, sepsis.

Evidence for efficacy of IA steroids in OA is mostly confined to the knee joint. There is evidence that IA steroids are effective but their benefit over placebo may be relatively short-lived,lasting from 1 to 4 weeks. In a recent meta-analysis evidence supports the short term (up to two weeks) improvement in symptoms of OA of the knee after IA injection.

However, significant improvement was also shown in methodologically studies addressing longer term response (16-24 weeks).A dose equivalent to 50 mg of prednisone may be needed to show benefit at 16-24 weeks.

Hyaluronic acid (HA),a high-molecular-molecular weight polysaccharide, is a major component of synovial fluid and cartilage. Viscosupplementation suggests that IA injection of HA could help restore the viscoelasticity of the synovial fluid, but HA has also been demonstrated to have multiple biological actions. The best indication of hyaluronic acid is a painful knee OA despite other pharmacological and non-pharmacological therapies, radiologically moderate, with no or mild effusion of the joint. HA acts as a symptomatic slow-acting drug with a delayed onset of efficacy of 2 to 5 weeks and a long-term benefit on pain and function which may persist until 6 to 12 months. Most studies include a 3-to 5-weekly injections treatment.

These so-called 'chondroprotective' agents designed to slow or prevent cartilage damage,have caused much controversy.

IA hyaluronic acid has a small effect when compared with an IA placebo. Approximately 80% of the treatment of IA- HA was accounted for by the placebo effect of an IA injection. The likely presence of publication bias suggests that even this effect may be overestimated. High-molecular-weight HA may have greater effect,but heterogeneity of the studies precludes definitive conclusions. Further independent trials are needed.

As a practical approach for a knee with effusion, steroid injections should be considered. Steroid injection should be preceded by synovial fluid aspiration and followed by a 24-hour rest, the usefulness of which remains to be proven in OA.

In the presence of symptomatic "dry" knees hyaluronic acid should be advised, especially in the case of non-endstage disease.

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L049

DISEASE- MODIFYING DRUGS FOR OSTEOARTHRITIS

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Osteoarthritis (OA) is the most prevalent and costly joint disease in older adults. Drugs for the treatment of OA can be classified into two groups: symptom modifying drugs, and structure-modifying drugs. Symptomatic treatment with a nonsteroidal antiinflammatory drug (NSAID) or analgesic may achieve some reduction in joint pain, but it is by no means satisfactory because of limitations in efficacy, cost, and side effects. Drugs that have a structural action on the disease process are now receiving increasing attention. A number of pharmacologic agents heve been shown to reduce proteolytic breakdown of articular cartilage in animal models of OA. Such agents have been called 'chondroprotective' drugs. However, because not only the cartilage but also all of the tissues of the joint are involved in this disease, it has been suggested recently that the preferable label is Disease-Modifying OA Drug (DMOAD). Several of the agents receiving current attention are discussed below.

Nonsteroidal Anti-inflammatory Drugs

In vitro evidence indicates that NSAID's may modify proteoglycan (PG) or collagen metabolism, cytokine-mediated matrix degeneration, release or activity of matrix metalloproteinases (MMP), and the actions of toxic oxygen metabolites. Therefore, i*n vitro* evidence suggests that NSAID's have DMOAD activity. As the animal species are sensitive to the gastrointestinal (GI) side effects of NSAID's and develop GI hemorrhage before the joint pathology is established, the number of *in vivo* studies is limited. I*n vivo* evidence in humans is also limited and controversial. While aspirin administration reduced the prevalence of degenerative changes in cartilage in humans after dislocation of the patella, it conferred no protection against cartilage degeneration in a prospective controlled study of patients with chondromalacia patellae. There are some studies suggesting that indomethacin might accelerate joint damage in OA. In a study comparing indomethacin to azapropazone, hip OA patients in the indomethacin group came to arthroplasty sooner. In another study comparing indomethacin to tiaprofenic acid and placebo in patients with knee OA, more than twice as many patients in the indomethacin group showed narrowing of the joint space in serial radiographs of the OA knee as those in the placebo group. Indomethacin use may lead to acceleration of joint breakdown in patients with OA but the supporting evidence is not wholly convincing as a number of concerns exist relative to the design of studies.

Heparinoids

Evidence of a DMOAD effect has been observed with glycosaminoglycan polysulfate (Arteparon) and glycosaminoglycan peptide-complex (Rumalon) in *in vivo* studies in animal models of OA. But a recent 5-year controlled study failed to confirm that GP-C has a DMOAD effect in patients with knee OA. In addition to their lack of efficacy as DMOAD's in human trials, some complications (bleeding, bovine spongiform encephalopaty, anaphylaxis) related to their use resulted in removal of these agents from clinical use. In contrast to GAGPS and GP-C, pentosan polysulfate(PPS) lacks antigenic protein constituents. PPS has been shown to reduce loss of

cartilage PGs in animal models but it remains to be demonstrated that pentosans have a DMOAD effect in humans.

Intra-articular Corticosteroid Injection

Results of a randomized double-blind trial in which patients with knee OA received IA injections of CS or saline every 3 months for 2 years showed efficacy for the steroid injections with respect to improvement in pain and range of motion. However, no 'chondroprotective' effect of the steroid injections was demonstrated.

Intra-articular Hyaluronan Injection

Preclinical data are contradictory with respect to whether IA injection of HA is beneficial or detrimental to articular cartilage. One study in a canine model of OA and another in an ovine model raise a concern that rather than protecting against joint damage in OA, HA injection into the joint may accelerate joint degeneration. Insufficient information is available to permit a conclusion concerning the effect of this treatment on the progression of OA in humans. Arthroscopic observations in the clinical trials led to the observation that HA treatment slowed the progression of chondropathy. Although arthroscopy is useful for observation of damage to menisci, ligaments, and the articular surface, it is not a good tool to detect anatomic or biochemical changes in the OA joint.

Tetracyclines

In a canine model of OA, cartilage ulcerations on the medial femoral condyles could be prevented by daily oral administration of doxycycline. The remarkable protective effect which this drug shows in animal models of OA involves control of the expression of MMP, through inhibition of transcription or inhibition of translation. Recent studies suggest yet another possible mechanism by which doxycycline may protect against cartilage breakdown involving nitric oxide (NO). The encouraging results in animal models have led to implementation of a plasebo- controlled multicenter clinical trial in humans to ascertain whether treatment with doxycycline can prevent development of OA joint damage in knees.

Diacerhein

Diacerhein, the first interleukin-1 inhibitor in OA is derived from rhubarb. It is an agent with demonstrated efficacy against the symptoms of OA, including pain and disability, as well as on the structural component. The symtomatic efficacy is observed 30 to 45 days after treatment onset. The structuromodulator effect of diacerein, which has been demonstrated with several animal models, has been evaluated in humans in a randomized double-blind trial versus placebo, ECHODIAH. This study, conducted in 507 patients with hip OA treated for three years, demonstrated that diacerein can slow down the progression of OA, as shown by radiographic evidence.

Avocado/ Soybean Unsaponifiables

An open pilot study and two double-blind, placebo-controlled clinical trials suggested a beneficial delayed and prolonged effect of Avocado/ Soybean Unsaponifiables (ASU) on clinical symptoms of OA of the knee and hip. ASU significantly reduced the consumption of NSAIDs and delayed the resumption of NSAIDs after they had been stopped in patients with symtomatic knee or hip OA who had regularly taken NSAIDs. The effects appeared by 1-2 months of ASU treatment.

Chondroitin Sulfate

The rationale for using symptom – modifying drugs such as chondroidin sulfate (CS) as a treatment for OA disease was in part empirical based on the observation that CS decreased with aging and OA. Nevertheless, recent studies do support its administration such as the fact that the sulfation pattern of CS was found to be significantly altered in both OA cartilage, plasma and synovial fluid. The structure-modifying effect was previously suggested in one animal study and two clinical studies including patients with knee OA and finger OA. The objective of a recent study was to investigate the efficacy and tolerability of a 3-month duration, twice a year, intermittent treatment with oral chondroidin sulfate in knee OA patients. This study provided evidences that oral CS decreased pain and improved knee function. The 3-month intermittent administration of 800 mg/ day of oral CS twice a year does support the prolonged effect known with symtom-modifying agents for OA. The inhibitory effect of CS on the radiological progression of the medial femoro-tibial joint space narrowing could suggest further evidence of its structure-modifying properties in knee OA.

Glucosamine Sulfate

Two recent, long- term, prospective, placebo-controlled studies have shown an improvement in symptoms and a stabilization of radiographic joint space width (JSW) in people treated with glucosamine sulfate compared with placebo. The results suggested that patients with less severe radiographic knee OA would experience, over 3 years, the most dramatic disease progression in terms of joint space narrowing. It is concluded that such patients may be particularly responsive to structure-modifying drugs. Narrowing of the medial tibiofemoral compartment joint space in paired standing knee radiographs, as used in these studies, may be due to differences in the position of the knee in the two examinations, in the severity of joint pain, in the distance between the knee and the cassette, or other technical factors. An National Institutes of Health-supported multicenter study, the Glucosamine Chondroitin Arthritis Intervention Trial (GAIT) is comparing glucosamine, chondroitin sulfate, the combination, and celecoxib with placebo in patients with knee OA. The primary outcome measure will be joint pain after 6 months of treatment. Radiographs of the 50% of subjects obtained at baseline will be compared with those obtained after 1 year and 2 years of treatment. As an alternative to the standing anteroposterior radiograph, a metatarsophalangeal view of the knee, which has been shown to possess excellent reproducibility in repeated examinations performed on the same day, is being utilized in the GAIT study. The most recent EULAR recommendations : an evidence based approach to the management of knee OA was published in 2003. According to the final set of recommendations based on both evidence and expert opinion, SYSADOA (glucosamine sulfate, chondroitin sulfate, ASU, diacerein, and hyaluronic acid) have symptomatic effects and may modify structure. There is growing evidence to support the use of two of these agents for their symptomatic effects – namely, glucosamine sulfate and chondroitin sulfate, but for the others the evidence is weak or absent.

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L050

NUCLEAR MEDICINE IN PM&R

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What Is Nuclear Medicine?

• the specialty responsible for the the use of radioactive materials for diagnosis or therapy.

• small doses of radio-pharmaceuticals are administered to patients to obtain functional/metabolic information for diagnosis (gamma, rarely X rays). Much larger doses are administered for therapy (particles such as beta).

Main Nuclear Medicine Applications in PM&R:

• Bone Mineral Densitometry
A) Methods (involving ionizing radiation)
• Single photon absortiometry (SPA)
a. ii. Dual photon absortiometry (DPA)
b. iii. DEXA
B) Osteoporosis
C) Limitations
• Radionuclide imaging of musculoskeletal systems
A) Bone scan
• Sport medicine (occult fx, stress fx and avultion fx, enthesopathies), Paget's disease/fibrous displasia, low back pain (differential diagnosis with bone SPECT), r/o metastases, sacroiliac joint index in ankylosing spondilitis, vertebral compression and sacral insufficiency fx's,
• Scintigraphic techniques
a. ii. Diagnosis
• Differential diagnosis
• Follow-up
A) recurrence
B) monitoring response to therapy
C) Muscle perfusion scintigraphy
• Cardiac imaging
A) MPS, Gated SPECT
• Myocardial perfusion
A) ii. Global and regional function evaluation
B) Diagnosis of CAD
C) Prognosis
D) Follow-up
• monitoring response to therapy (exercise, medical, S/P CABG, S/P PTCA)
A) Assessment of exercise capacity after cardiac rehabilitation.
• Neurological imaging
A) Post stroke functional recovery potential
B) Parkinson's disease
• Early diagnosis
A) ii. Differential diagnosis of other diseases causing parkinsonism PET / SPECT imaging
B) iii. Monitoring response to therapy
C) Stroke effects on language
D) Brain mapping
• Radionuclide therapy
A) Local (radiosynovectomy in arthritis and hemarthrosis of hemophilia)
• The injection of a radioisotope in to the joint for treatment –resistant synovitis a possible alternative to surgical synovectomy.
A) Systemic / targeted (palliative treatment of painful osteoblastic bone metastases)
• New radio-pharmaceuticals and PET-CT

Take Home Message

Nuclear medicine imaging is a non-invasive in vivo diagnostic imaging modality reflecting the function, metabolism. It provides molecular imaging with positron emitters (PET imaging). It is not influenced by postoperative, post-RT changes and orthopedic hardware.

• Nuclear medicine is used in therapy as well (radiosynovectomy).
• May provide prognostic / predictive information.
• Monitoring response to therapy follow-up

L051

RADIOLOGICAL APPROACH TO CHRONIC HIP PAIN IN ADULTS

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Chronic hip pain in the setting of a normal-appearing radiograph and a nonspecific history and clinical findings can be a difficult diagnostic dilemma. Radiographically, there are often extremely subtle radiographic signs that point to the most frequent causes of chronic hip pain, namely trauma, infection, arthritis, tumor, avascular necrosis, and hip dysplasia. CT and MRI can add useful information that can lead to the diagnosis. CT is the most sensitive imaging technique for detection of subchondral fractures, articular collapse, and degenerative changes, since it can excellently depict the cortical surfaces of bones, an area devoid of signal on MRI. MRI has the advantage of showing fluid and edema pattern within the joint, bone, and adjacent soft tissue, therefore, in addition to its high sensitivity, the full extension of the abnormality is possible with this technique.

Some tips about normal radiologic anatomy of the hip

In the normal femoral head on CT, physiologically thickened load-transmitting trabeculae appear arranged in the form of a star, the so called 'asterisk sign'. The raylike branches of the star usually extend to the upper surface of the femoral head. Normally there may be some clumping and thickening in the center of the star, but not in the periphery. On axial MR sections it appears as a central area of low signal intensity within the femoral head and should not be mistaken for an area of pathology. It appears dark because it contains relatively more calcium than adjacent fatty marrow.

The MRI appearance of the marrow of the hip joint depends upon age related changes. Yellow marrow, which is hematopoietically inactive, is composed predominantly of fat cells and thus demonstrates marked hyperintensity on T1-WI. Hemotopoietically active red marrow contains much less fat. The most obvious changes in the marrow appearance occur in the childhood. The adult pattern of distribution is attained at mid-twenties, and after then, the fractional balance of yellow and red marrow in the femur slowly changes with advancing age.

In children, a broad curvilinear low intensity line between the capital epiphysis and metaphysic represents the physical growth plate. With aging, the growth plate fuses, and a thin dark line in the same location in the adult represents the dense bone of the fused physis. The physial scar varies in length and should not be confused with an incomplete or a healing fracture.

A small amount of fluid may be visible in more than 80% of normal hip joints. Young subjects tend to have more normal fluid than older subjects, and minor disparities between the right and left sides in the

quantity of fluid are common. Generally, fluid that does not surround the femoral neck or distend the joint is considered normal.

Acetabular labrum lesions

Acetabular labrum abnormalities occur at any age. Labral tears may or may not be associated with dysplastic changes of the acetabulum. Cystic degeneration of the labrum and ganglions about the labrum may be associated with labral tears. Labral tears often lead to rapidly progressing OA of the hip.

Occult trauma

The diagnosis of hip fractures can be difficult on radiography alone. MRI is frequently used to confirm or deny the presence of a minimally displaced hip fracture. Two kinds of occult fractures are related to the transient dislocation of the hip: **acetabular rim fracture** and the **impaction fracture**: Acetabular rim fractures can be easily overlooked if the acetabular rims are not carefully identified as being intact. Impaction fractures are analogous to the Hill-Sacs impaction fractures seen following shoulder dislocation, and are seen as sclerotic concave lines, as opposed to the lucent subchondral lines seen with avascular necrosis (AVN) [1]. **Stress fractures** can be occult because they are rarely displaced. Runners frequently develop stress fractures at the superior and inferior pubic rami or at the medial femoral neck. High degree of suspicion based on the patient history, expected location, and careful analysis are required to reach the correct diagnosis. When they are subacute, they are easily seen as a lucent line surrounded by sclerosis, but acute fractures are difficult to see as they cause only a subtle lucency or sclerosis. In all acute fractures, sclerosis is due to impaction rather than the healing process [1]. **Apophyseal avulsion fractures** are seen in young adults as the pelvic apophyses appears at puberty and do not fuse before age 25 years. They occur at the anterior superior iliac spine, anterior inferior iliac spine, ischial tuberosity, and pubis. They appear as thin, crescentic or disk-shaped, ossific opacities. They can be quite subtle when acute and may later develop prominent soft tissue ossifications at the fracture site. **Insufficiency fractures** are most commonly located in the subcapital region of the osteoporotic patients. However, acetabular insufficiency fractures also occur and should be looked for carefully in these patients [1]. Diagnosis of minimally displaced hip fractures on radiographs can be challenging, especially in elderly patients with osteoporosis. A major traumatic event is not required as a cause of fracture, besides a clear history of trauma may not be readily available in these patients [2]. Furthermore, hip fractures in the elderly may present with atypical symptoms, such as several weeks of pain or gait instability. Subtle femoral neck angulation, trabecular angulation, or a subcapital impaction line must be alerting on the radiographs [1]. Position can cause a difficulty in patients with subcapital fractures or hip pain. Painful hips are often held in flexion and abduction, which can foreshorten femoral neck and obscure an abnormality by overlap with the greater trochanter [1]. MRI is helpful when there is a strong suspicion of fracture but the radiograph is normal, and in case of a known insufficiency fracture with clinical suspicion for acute refracture. Bone scintigraphy is traditionally used in patients with hip pain with or without a history of trauma, and who have negative or equivocal radiographic findings for hip fracture when MRI is not immediately available or is contraindicated. However, despite its high sensitivity, false negatives and false positives are possible with bone scintigraphy. False negative findings can occur especially in the elderly patients when the scintigraphy is performed within 72 hours after trauma, related to slower bone turnover rate in this age group. Among the reasons of false positives, there are myositis ossificans, calcific capsulitis, trochanteric bursitis, transient osteoporosis of the hip, active degenerative changes, and presence of collar osteophtes around the femoral neck which is relatively frequent in the elderly population [3]. Therefore, bone scans obtained for suspected occult hip fracture should always be compared with radiographs. No history of recent trauma, normal bone mineralization, and marginal osteophytes indicates causes other than hip fracture, such as exacerbation of OA. MRI is at least as sensitive as bone scintigraphy in the detection of hip fractures and associated bone and soft tissue changes. Failure to visualize a hip fracture with MR has a 100% negative predictive value. When MRI is not available or contraindicated, CT can be used to show fractures or degenerative changes. Complete or incomplete intertrochanteric insufficiency fractures may occur in the same patient group (elderly osteoporotic). Incomplete intertrochanteric fractures can be diagnosed only with MRI, and some of the radiographically detected greater trochanter fractures are in fact incomplete intertrochanteric fractures [4]. Differentiation of complete from incomplete fracture, and delineation of the extent of the incomplete fracture is important to ensure proper treatment.

Subchondral insufficiency fracture is also seen in elderly osteoporotic females who are often obese. The pain is usually has an acute onset that gradually worsens. No risk factors for osteonecrosis, including corticosteroid intake, alcohol abuse, or underlying diseases are present. On MRI, subchondral linear or serpenginous pattern of very low intensity band on the T1 weighted images with an associated bone marrow edema is characteristic [5-7]. The fracture lines are located on the anterosuperior portion of the femoral head, which is subject to the highest contact pressure [7]. The most important differential diagnosis is osteonecrosis. In fact, most of these cases had originally been considered as osteonecrosis [6]. The circumscribed lesions on MRI, which are commonly observed in osteonecrosis, are not seen in this condition [5]. Some cases of subchondral insufficiency fracture occasionally result in a rapid destruction of the hip joint following subchondral collapse, within as short as one month [5].

Associated bone injuries that involve the innominate bone or adjacent muscles are common in hip fractures. Pelvic fractures commonly associate hip fractures (24% in one series), fractures of the obturator ring being the most common [2]. Diagnosis of these associated fractures, which are important for allowing the physician consider physical therapy and early mobilization, are possible with MRI.

Soft tissue injuries are commonly seen in association with subtle fractures on MRI (65% in one series) [2] but may exist in isolation and may mimic fractures by producing similar symptoms. Muscle injury may be caused by a direct blow or a strain due to abnormal stretching. These injuries include muscle edema, hematoma, and partial or complete muscle tear. In a setting of trauma, it may be difficult to differentiate an isolated hematoma from a hematoma arising from a muscle injury. A hematoma may show varying signal intensities on both T1 and T2 weighted images, depending on the evolving state of hemoglobin. Most of the injuries occur in the obturator externus muscle, a major external rotator (43% in a series) [2]. MRI is recommended for all symptomatic patients whose radiographic findings are negative for hip fracture.

Infection

Primary septic arthritis is rare in adults, but it may present insidiously in immunocompromised patients. Septic hip is diagnosed when effusion, cartilage loss, and cortical bone destruction are present. In the very early phase, when cartilage loss is not seen and the radiographic findings are extremely subtle, convexity of a fat pad which implies distention of the hip joint with fluid, may be the only diagnostic sign. This sign can be helpful if seen on an appropriately positioned radiograph, but its absence is not of diagnostic value. Decrease in cortical “distinctness” is another early sign of septic hip, and should be sought both on the acetabulum and the femoral head. Effusion can be easily shown with US and MRI. However, differentiation of septic arthritis from other arthritis cannot be achieved by US alone. Furthermore, US does not allow one to rule-out osteomyelitis or soft tissue infection.

Infection and aseptic loosening in total hip replacements

Pain is a frequent symptom after total hip replacement, occurring in as many as 20% of patients. Infection, mechanical loosening, heterotopic bone formation, prosthetic and periprosthetic fractures, acetabular malposition, and foreign body reaction to polyethylene debris are local complications associated with a hip prosthesis, mechanical loosening being the most common. Infection can closely mimic clinical findings of mechanical loosening. The distinction is important, because loosening is treated with revision arthroplasty, whereas infection requires removal of the prosthesis and antimicrobial therapy. Fluoroscopy-guided aspiration is invasive and controversial. Conventional radiography, scintigraphy with bone and gallium scanning, arthrography, CT, and MRI have some limitations. Radiographic criteria of infection: rapid prosthetic migration (of at least 2 mm within 6-12 months), rapidly progressive and/or irregular periprosthetic osteolysis. Radiographic criteria of loosening: less than 2 mm migration within 6-12 months, periprosthetic lucency in a smooth area of 2 mm or greater in diameter, periosteal reaction of solid type, and/or cement fracture. However, radiographically, there is considerable overlap between the two diagnoses. For example, periprosthetic focal or nonfocal lucency, and asymmetric position of the femoral head in the acetabulum are expected both in infection and in loosening [8,9], periprosthetic periosteal reaction is found specific to infection in some studies [8], but not in others [9]. Obtaining serial radiography overcomes much of the difficulty in radiographic differential diagnosis[9]. Bone scintigraphy is of limited value in the diagnosis of infection and aseptic loosening within 12 months after an arthroplasty surgery, because postsurgical inflammatory changes may persists for years [9]. FDG-PET offers no benefit in addition to bone scintigraphy [9]. CT scans, although image detail is degraded by metal artifacts, is accurate in depiction of soft tissue abnormalities, namely fluid collections within the joint and around the prosthesis (in muscles and perimuscular fat, and fluid-filled bursae). While joint effusion may also occur in loosening, other sites of fluid collection was shown to be specific to infection [8]. Therefore, soft tissue findings, rather than bone periprosthetic abnormalities are regarded as more valuable in the differential diagnosis of aseptic and septic loosening of the hip.

Iliopsoas and trochanteric bursitis

Among the numerous bursa in the hip region, the ilopsoas and the trochanteric bursa are the clinically most important ones. The iliopsoas bursa lies between the iliopsoas muscle and the anteromedial surface of the hip joint. Iliopsoas bursitis may mimic an arthritic hip disorder. A markedly distended iliopsoas bursa may produce a mass in the inguinal region, simulating a hernia, lymphocel, abscess, or heamatoma.

Inflammation of bursa between the greater trochanter and fascia lata characteristically induces pain over the trochanter (not in the groin), and is usually self-limiting.

Transient osteoporosis of the hip (TOH)

In TOH, periarticular osteoporosis occurs, but the cartilage remains intact [1]. No apparent history of trauma or infection is present, and the mechanism of the demineralization remains unclear. TOH typically occurs in young and middle aged adults, particularly men. In female patients the disease often begins in the third trimester of pregnancy. Suddenly established progressive hip pain over several weeks with spontaneous and complete resolution of symptoms and all imaging findings in 2 to 6 months are characteristic. Histologically, it is characterized with focal areas of thin and disconnected trabeculae and with surrounding edematous bone marrow [7,10]. Although, lack of any subchondral change was earlier believed to be a 100% predictable sign of TOH and is therefore useful to make the distinction between TOH and ON [11,12], recent studies suggest that, subchondral fractures may occur in the mechanically weakened bone trabeculae histologically shown in TOH [7,10]. Only a slight stress on the femoral head is enough to cause these fractures. Radiographically, a diffuse periarticular osteopenia of the upper femur is present. Bone scan shows focal, periarticular, homogeneously increased uptake, as evidence of increased blood flow and increased capillary permeability or both, reflecting high perfusion [7,10]. On MRI, a relatively homogenous area of decreased signal intensity on T1, and corresponding area of increased signal intensity on T2WI are seen, representing a transient increase in bone marrow water content [7]. Occasionally this bone marrow edema pattern may extend into the intertrochanteric region or the acetabulum [7,10]. A joint effusion is commonly associated to the bone marrow edema [7,10]. The more extensive, diffuse, and relatively homogenous involvement differentiates this disorder from ON [10]. Subchondral fracture lines in transient osteoporosis need to be differentiated from subchondral collapse in ON, the so-called crescent sign. This however, forms a double line. Besides, once subchondral collapse occurs in cases of ON, both the symptoms and the collapse are usually progressive in contrast to the spontaneous resolution of symptoms and radiologic findings in TOH [7]. No bilateral involvement was reported for TOH. ON the other hand, has been reported to be bilateral in as much as 72% of the patients [10]. Septic arthritis is another differential diagnosis (focal osteoporosis, effusion, and positive bone scan). TOH is a diagnosis of exclusion, and a hip aspiration is often necessary to differentiate it from a septic process [1].

Osteonecrosis (ON):

MRI is reported to have a sensitivity of 97% [1,3] in ON. It is more sensitive than CT, bone scintigraphy, and conventional radiography. However, it is only 85% specific in differentiating ON from other hip abnormalities, which necessitates the interpretation always be performed in correlation with radiography [1].

ON is caused by an interruption of blood flow to the femoral head. Limited arterial supply and limited venous drainage are important in the mechanism. In the hip, which is the most common site, ON occurs adjacent to the weight-bearing articular surface of the femoral head. After an initial ischemic insult, hematopoietic cells die within 6-12 hours, and marrow fat cells die in 2-5 days [13]. Early MRI abnormalities depend on bone marrow fat cells dying after the ischemic event and on the development of a hyperemia response in viable tissue adjacent to the infarct. Hyperemia is subsequently replaced by reactive sclerosis, in which reactive new bone is laid down over dead trabeculae, which produces a sclerotic margin [13,14]. This reactive sclerosis is the earliest finding of ON radiographs. Indeed, the depiction of findings on radiographs lags several months behind the time of injury. Mechanical failure of trabeculae results in microfracture and collapse of the dead subchondral cancellous tarbeculae, which leads to the development of a subchondral radiolucent area along the fracture line, which may or may not extend through the overlying articular cartilage. This fracture, known as the ‘crescent sign, is typically seen along the anterolateral aspect of the proximal femoral head, which can be detected more easily on a frog-leg lateral radiograph [1,14]. Once it is detected, further collapse is likely [14]. Therefore, the presence of subchondral fracture is vital for staging ON and planning subsequent treatment. Usually, surgical treatment with bone grafting or joint arthroplasty is required at this stage[15].

Articular cartilage is spared from injury because its nutrient supply is from synovial fluid.; however, with loss of subchondral bone, cartilage may be damaged due to frank collapse or altered mechanics [13]. Radiographic signs are areas of radiolucency and sclerosis, bone collapse, joint space narrowing, and characteristic subchondral radiolucent crescent. Some of these findings indicate a late, irreversible stage of the disease. Radiographic appearance of ON is classified according to the *modified Ficat system*: Stage 0: no clinical or radiographic findings; Stage 1: there are clinical symptoms but no radiographic findings; Stage 2 and higher: radiographic findings (stage 2:osteopenia, sclerosis, cystic areas; stage 3: flattening of the femoral head; stage 4: secondary OA of the hip) [13]. An alternative classification is proposed by *Steinberg et*

al: stage 1: radiography is normal; stage 2: cystic and sclerotic changes; stage 3: subchondral crescent sign; stage 4: flattening of the femoral head; stage 5: joint space narrowing; stage 6:advanced degenerative change [16].

Typical MR finding of ON, is a subchondral lesion of variable signal intensity that is demarcated from the surrounding tissue by a rim of low signal intensity on T1 weighted images and of low and high signal intensity on T2 weighted images. *Patterns on T1 weighted images are*: 1) a well defined homogeneous area of low signal intensity, 2) a band of low signal intensity crossing the femoral head, 3) heterogeneous loss of signal intensity in the femoral head containing foci of normal signal intensity. *On T2 weighted images*, the most characteristic pattern of involvement is the 'double line' appearance, which occurs later in the disease process, after the start of osseous repair [13]. The 'double line' sign is seen in 80% of the cases. It consists of a high signal intensity line within a parallel rim of low signal intensity, often with serpentine borders. The outer hypo intense line is narrower than the inner line, and reflects bone sclerosis. The inner hyperintense line reflects granulation tissue formation. Corresponding T1 weighted images demonstrate both (high and low signal intensity) zones together as a single low-intensity band [13]. Clinical and radiological stages of the disease are classified according to the *Ficat system*: stage 1: radiography is normal, but MR or bone scintigraphy will confirm ON; stage 2:cystic and sclerotic changes are seen on radiography; stage 3: crescent sign on radiography (subchondral fractures); stage 4:flattening of the femoral head, joint space narrowing, and severe joint destruction [14].

Classification according to the ARCO classification is as follows [12]: stage 0: bone biopsy results are consistent with ON, normal findings on all other tests; stage 1: positive scintigram, MR, or both; stage 2: radiographic abnormalities, no sign of collapse of the femoral head; stage 3: radiographic crescent sign; stage 4: flattened articular surface, narrowed joint space, and changes in acetabulum.

Diffuse edema pattern in the femoral head and neck is less common in ON and are difficult to differentiate from TOH, and occasionally infection or tumor. İv contrast use in this situation helps in differentiating enhancing viable tissue from nonenhancing necrotic tissue. In TOH, the contrast enhancement is homogeneous, whereas in ON it is generally focal, well marginated, and inhomogeneous. Diffuse bone marrow edema pattern, when occurred in ON is highly correlated with the subsequent collapse of the femoral head [17]. It occurs most often in stage 3 disease and has a strong association with pain [12,18]. Pain improvement usually parallels the resolution of edema [12]. Localized edema is a secondary phenomenon that follows ischemic attack and surrounds the necrotic region. The probable causes of bone marrow edema are subchondral fracture, intramedullary venous stasis, and secondary reaction to tissue ischemia [12,18]. Scintigraphy performed during the presence of edema exhibits increased radionuclide uptake, which indicates increased blood flow, increased capillary permeability, or both [12]. The amount of joint fluid in ON was found significantly correlated with the stage of the disease, but not with bone marrow edema [19]. The amount of joint fluid in the affected hip is classified according to the grading system proposed by *Mitchell et al* [20]: grade 0:none, grade 1: minimal, grade 2: enough to surround the femoral neck, and grade 3:distention of the capsular recesses. Joint effusion has high signal intensity on fat-suppressed T2 weighted images, but for its differentiation from synovial membrane, contrast enhanced T1 weighted images are needed. Joint effusion of a grade greater than or equal to 2 occurs most often in stage 3 disease [19]. Joint effusion contributes little to pain [12,18].

Although MRI is the technique of choice for detection of ON, it has been reported to be of limited value in the detection of subchondral fractures. CT is the most sensitive imaging technique for detection of subchondral fractures, articular collapse, and secondary degenerative changes in ON, since it can excellently depict the cortical surfaces of bones, an area devoid of signal on MRI. Besides, on MRI, necrotic bone marrow, cellular debris, granulation tissue, and bone sclerosis can all result in low signal intensity on T1 and T2 weighted MR images, potentially obscuring subchondral fractures [15]. Bone marrow edema can also obscure secondary fractures [18]. When compared to CT, MRI has a sensitivity of 38% and a specificity of 100%, and radiography has a sensitivity of 71% and a specificity of 97% [15]. On MRI, subchondral fractures are depicted as high signal intensity lines on T2 weighted images, representing fluid accumulation in the subchondral fracture, and the fractures that were seen initially on CT but not on MR may be explained by the absence of fluid in the fracture defect [15]. The fluid may result from extension of joint fluid through the fracture in the subchondral bone, which indicates damage to the overlying articular cartilage that may be a predictor of more rapid progression to secondary OA [15]. Therefore, although MRI is suitable for the early diagnosis of femoral head ON, CT is required for subsequent staging and follow-up, since differentiation of stage 3 disease from the stage 2, which is mandatory for the selection of treatment options is most reliable only with CT [15].

Arthropaties

Hip arthropathies can be quite subtle radiographically. Cartilage loss, osteophytes, erosions, subchondral cysts and protrusio should be sought. **Spondyloarthropathy** should be considered in young adults with hip pain, and if hip abnormalities are found, the sacroiliac joints should be examined [1].

Rheumatoid arthritis (RA) may manifest as osteopenia, uniform cartilage loss, and erosive change. However, the hip appears normal during the early disease process. MRI may show pannus. Decompression of a large effusion through the weak anterior hip capsule, into the iliopsoas bursa results a mass in the anterior groin, which can easily be diagnosed at CT or MRI [1]. Tendon ruptures around the hip, which can develop in RA patients can be seen at MRI.

Osteoarthritis (OA) is the most common reason of hip pain and dysfunction. Although loss of joint space due to wear of the articular surfaces is the critical feature, OA can manifest radiographically as cyst formation, very small osteophytes, or buttressing of the femoral neck. Each of these findings can be seen alone and can be quite subtle [1]. With the onset of joint space narrowing, the femoral head moves toward the acetabulum. Three basic patterns of migration can be observed: superior, medial, and axial. This classification system relies on changes on the frontal radiograph; anterior and posterior patterns of migration, as evident on lateral radiographs, have not been used to classify osteoarthritis of the hip. The most common pattern is superior; the medial pattern is uncommon, and axial pattern is distinctly unusual. Superior migration of the femoral head in association with sclerosis, cysts, and osteophytes usually ensures the diagnosis of osteoarthritis. Thus, the appearance of diffuse joint space loss with axial migration usually indicates another disease process, such as RA, infection, or cartilage atrophy due to disuse or immobilization. In all of these diseases, osteophytosis and sclerosis are usually not prominent [21]. If axial migration of the femoral head is accompanied by sclerosis and osteophytosis, AS and CPPD crystal deposition disease should be considered [21]. An unusual form of OA is **primary protrusio**, in which protrusio and degenerative changes are established at an early age, more frequently in women. It is thought to be due to a failure of acetabular ossification and remodeling and is hereditary [1]. Secondary degenerative joint disease superimposed on another primary process can lead to symmetric loss of joint space, osteophytosis, and eburnation at an early age. It can result from previous trauma with acetabular fracture, slipped capital femoral epiphysis, synovial disorders such as RA, Paget, epiphyseal dysplasia, and AVN [1,21]. When cysts and osteophtes are seen in the absence of joint space narrowing, CT scan should be considered to look for narrowing in the posterior aspect of the joint, or evidence of a labral tear anteriorly [21].

The first visible change in OA often occurs in the subchondral plate of the acetabulum. The density of the plate is normally uniform and symmetric in composition with the opposite hip. Due to pressure concentration in the arthritic hip, the subchondral plate will thicken and appear sclerotic in a focal area, usually at the lateral edge of the acetabulum. Osteophytes, joint space narrowing, and lateral migration of the femoral head in the socket also occur early but can be difficult to appreciate. Cysts usually form late, after the loss of articular cartilage. In a rare cystic form of OA, multiple subchondral cysts are observed before loss of joint space and osteophyte formation. In fact, the term "cysts" is not entirely accurate. They occur between thickened trabeculae within the pressure segment of the subchondral bone. They are commonly multiple and of varying size (2 to 20 mm in diameter). Cysts that are single or larger than 20 mm in diameter are unusual (although union of neighboring cysts are possible). Two theories of pathogenesis are proposed: synovial fluid intrusion and bony contusion. Probably both theories operate together in the pathogenesis of the cystic lesions. On x-ray, they appear as multiple radiolucent areas of varying size on apposing surfaces of bone in the pressure segment of the joint, which must be differentiated from the subchondral lucent lesions in other disorders such as RA, CPPD crystal deposition disease and osteonecrosis. Subchondral cyst may follow a bone injury. It resembles a degenerative cyst except that it is larger in size and the joint itself is relatively normal. Intraosseous ganglion may also simulate degenerative cyst. Absence of a significant history of trauma, sclerotic margins, occurrence in nonpressure areas of joint, relatively normal joint, lack of communication with the adjacent joint, adjacent soft tissue ganglion, and its relatively large size are the characteristics of this lesion. Subchondral cysts in degenerative joint disease must also be distinguished from some primary and secondary malignancies (skeletal metastasis, giant cell tumor, and chondroblastoma).

While articular space loss, eburnation, and subchondral cysts are characteristic of pressure segments of the joint, marginal osteophtes predominate in nonpressure segments. In the femoral neck, bone may develop from cartilaginous stimulation by the periosteum or the synovium (the counterpart of periosteum), where it is termed buttressing. In the degenerative hip joint, buttressing predominates on the medial aspect of the femoral neck, related to mechanical stress across the articulation. The mechanical stress, leading to microfractures, stimulates the synovial tissue with subsequent apposition of bone. On x-ray, a radiodense line of variable thickness extends along a part of or the entire femoral neck. Buttressing is most commonly observed in osteoarthritis, although it is also apparent in osteonecrosis, congenital subluxation of the hip, RA, AS, an even adjacent to osteoid osteoma.

The radiographic (and pathologic) differentiation of osteoarthritis (with and without osteonecrosis) from osteonecrosis with secondary joint degeneration can be extremely difficult. In the latter situation, a greater degree of osseous collapse and a more widespread or uniform loss of joint space may be observed.

Rapidly destructive OA of the hip is a unique hip disorder characterized by rapid chondrolysis (<2mm in 1 year or 50% joint-space narrowing in 1 year). Clinical history (rapid progression of hip pain within 1 year) and follow-up radiographs are both sufficient and necessary for making the diagnosis. Average age of patients is greater than that of most patients with ordinary OA. Narrowing of the superolateral joint space, subchondral sclerosis, subchondral cyst formation are seen as in ordinary OA. Differently, osteophyte formation is absent or minimal [22]. Within the radiologic differential diagnosis are septic arthritis, inflammatory arthritis, AVN with secondary OA, pyrophosphate-associated destructive arthropathy, and neuropathic osteoarthropathy. On MRI, all cases show joint effusion and bone-marrow edema like pattern in the femoral head and neck, mostly including the acetabulum [22]. Subchondral fractures shown in some patients suggested subchondral insufficiency fracture to be claimed as one possible reason of the rapidly destructive OA [5].

Tumor

All osseous tumors can occur about the hip. Early lytic lesions can be difficult to see. Disturbance of the trabecular pattern may suggest an early permeative destruction. A generalized decrease in overall bone density without any focal lesions in a middle age man should be alarming for multiple myeloma. Posterior iliac wing lesions may be easily missed due to superimposed sacral wing and soft tissues. Avulsion of lesser trochanter in an adult is usually due to a pathologic fracture. Osteoid osteoma of the hip can be particularly confusing. It is most commonly seen in the femoral neck. Because this location is within the joint capsule, the associated reactive bone formation may be found several centimeters away from the nidus, which may mislead the biopsy. The lesion can induce synovitis and result in early OA, which may be confused with simple OA.

MRI is extremely sensitive in the detection of bone marrow based pathologic conditions.

Hip dysplasia

Diagnosis may be difficult when the femoral head and neck are normally shaped. Femoral head coverage by the acetabulum may be the only key to diagnosis. The center-edge angle is the most often used criterion when the dysplasia is subtle.

Paget's disease

The pelvis is often affected in Paget's disease and cause hip pain. Co-existing arthritis should also be considered.

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L052

VERTEBROPLASTY AND KYPHOPLASTY IN OSTEOPOROTIC VERTEBRAL FRACTURES

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The treatment of osteoporotic vertebral fractures is an increasing challenge. The incidence of osteoporotic fractures is rapidly increasing in western and asian countries. A fracture of one or more vertebrae will occur in about one third of all women during lifetime. In the acute situation pain is the challenge followed by the consequences of the fracture collapse in the body of the vertebra. The acute collapse with or without a progression during the first month may result in a thoracal or lumbar kyphosis which may result in backpain and reduced to thoracic and abdominal volume. Reduced lung function and gastrointestinal problems are common.

Promising surgical treatment options have been introduced during the last two decades. Vertebroplasty was initial described by Galibert et al. in 1987 and kyphoplasty was developed by Reileyin in 1998. Both are in principal an internal splinting of the vertebral fracture.

The patient is placed in prone with bolsters located on the sternum and pelvis in an attempt to reduce the kyphosis. In vertebroplasty viscous cement is injected into the vertebral body percutaneously with a 11-G trochar under fluoroscopy control.

In kyphoplasty an inflatable balloon is introduced during the cannula. The balloon is inflated in an attempt to restore the collapsed vertebra to its normal shape and create space within the body for injection of the cement.

Both methods are very effective in acute pain relief with a succes rate of 70-90%. The long term effect is more unclear.

A significant kyphosis correction has been documented by kyphoplasty, but the long term advantage is not known. Serious complications are very rare.

In Europe vertebroplasty gain increasing interest and is now an established treatment at several centres. Although no European consensus has been obtained, the used indication is severe pain following one or more osteoporotic vertebral fractures, which has been resistent to conservative pain treatment during 3-4 weeks. Vertebroplasty is normally advised to be conducted before 3-4 months as elapsed. When the fracture is healed judged by MR and technitium scan the results following vertebroplasty are inferior.

Kyphoplasty is still considered experimental and only introduced at few centres. Kyphoplasty is normally reserved for selected cases with severe deformity following osteoporotic fracture.

L053

AGING WORLD

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"It is not age that is at fault but rather our attitutes toward it"
CICERO

Dramatic changes in fertility and mortality rates during the twentieth century demonstrated that the world will age rapidly during the twentyfirst century.Three principal factors should be taken into consideration to determine the speed and pattern of population aging;

1-The decline in fertility rates-Has the effect of producing a gradual but sustained increase in the ratio of older to younger people in a population.

2-The decline in mortality rates-Have fallen substantially in many countries over the past century as the result of a combination of advances in public health, medical technology and standards of living.

3-The rise in post World War II fertility rates-This increase in fertility rates contributed temporarily to younger age distributions, but the aging of baby boom cohorts will soon accelerate population aging in these countries.

Average life expectancy at birth has increased by 20 years since 1950 to 66 years and is expected to extend a further 10 years by 2050.This demographic triumph and the fast growth of the population in the first half of the 21 st Century mean that the number of persons over 60 will increase from about 600 million in 2000, to almost 2000 million in 2050 and the proportion of persons defined as older is projected to increase globally from 10 percent in 1998 to 15 percent in 2025.

The remarkable demographic transition under way will result in the old and the young representing an equal share of the world's population by midcentury.Globally, the proportion of persons aged 60 years and older is expected to double between 2000 and 2050, from 10 to 21 percent, whereas the proportion of children is projected to drop by a third, from 30 to 21 percent.In developed countries and countries with economies in transition, the number of older persons already exceeds the number of children and birth rates have fallen below replacement lewels.In some developed countries, the number of older persons will be more than twice that of children by 2050.

International Year for Older Persons-1999

A society for all ages, which was the theme for the 1999 International Year for Older Persons, contained these dimensions: individual lifelong development, multigenerational relationships; interrelationship between population aging and development and the situation of older persons.The international year helped to advance awareness, research and policy action worldwide, including efforts to integrate the issue of ageing in all sectors and foster opportinities integral to all phases of life.

International Plan of Action on Ageing-2002

Central themes running through the International Plan of Action on Ageing 2002 are;

1-The achievement of secure ageing, which involves reaffirming the goal of eradicating poverty in old age and building on the United Nations principles for older persons,

2-Empowerment of older persons to fully and effectively participate in the economic, political and social lives of their societies, including through income-generating and voluntary work,
3-Provision of opportunities for individual development, self fulfilment and well being throughout life as well as in late life, through, for example access to life long learning and participation in the community while recognizing that older persons are not one homogenous group,
4-Ensuring the full enjoyment of economic, social and cultural rights and civil and political rights of persons and the elimination of all forms of violence and discrimination against older persons,
5-Commitment to gender equality among older persons through inter alia elimination of gender based discimination,
6-Recognition of the crucial importance of families, intergenerational interdependence, solidarity and reciprocity for social development,
7-Provision of health care, support and social protection for older persons, including preventive and rehabilitative health care,
8-Facilitating partnership between all levels of goverment, civil society and private sector and older persons themselves in translating the International Plan of Action into practical action,
9-Harnessing of scientific research and expertise and realizing the potential of technology to focus on inter alia, the individual, social and health implications of ageing, in particular in developing countries,
10-Recognition of the situation of ageing indigenous persons, their unique circumstances and need to seek means to give them an effective voice in decisions directly affecting them.

Geriatric Medicine

The discipline of geriatric medicine arose in part because aged patients are more complex than they were in middle age. Older people are predisposed to suffering bad health outcomes, including bothersome symptoms, diminished ability to perform desired tasks and roles, and death.The rate of decrease in physiological capacity and its time of onset differ among persons, but a decrease in universal at some point after the age of 30.The decrease in physiological capacity may be imperceptible throughout life, but often physiological capacity falls below a threshold that is noticed. There are several clinically important consequences of geriatric patients'diminished physiological reserve;1-Disease presentation in older persons is often atypical,2-With many older persons, symptoms and findings coincide in time and are unrelated,3-Diminished physiological reserve produces weakened compensatory mechanisms, which may otherwise allow a disease to present at an earlier, less severe stage in elders,4-Weakened compensatory mechanisms contribute to the slowed recovery from illness seen in many elders,5-Certain preventive measures (eg, vaccines, physical activity) are beneficial in many elders because they support focal areas of diminished reserve,6-Beyond the fact that older patients have more interactions with the health care system (more drugs, more procedures), their weekened reserve puts them at greater risk of iatrogenic injury.

Comprehensive Geriatric Assesment

A multidimensional, usually interdisciplinary, diagnostic process intended to determine a frail elderly person's medical, psychosocial, and functional capabilities and problems.Comprehensive geriatric assessment has many immediate and long term purposes, including achieving a multidimensional diagnostic evaluation, developing an overall plan for treatment and long term follow up, arranging for treatment and rehabilitation, facilitating primary care and case management, determining long term care needs and optimal placement, and making the best use of health care resources.
A comprehensive geriatric assessment differs from a standard medical evaluation in its concentration on frail elderly people with complex problems, it emphasis on functional status and quality of life, and its frequent use of interdisciplinary teams.Because of the great variety of elders needs, functional deficits, social supports, and goals of care, professional services for this group are provided in more settings than with any other population.Familiarity with the capabilities, characteristics, strengths, and weakness of local clinics, acute hospitals, rehabilitation hospitals, skilled nursing facilities, residential care facilities, geropsychiatric units, home care agencies will assist the clinician in caring for older patients.
It also should be taken into consideration that; with older persons, the key to diagnosis and treatment in a difficult situation often lies in the social history.Many elders come to medical attention because of some combination of economic constrains and social isolation.

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L054

SPA THERAPY, BALNEOTHERAPY AND HYDROTHERAPY

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The use of water for medical treatment is probably as old as mankind. Water has been used medicinally for thousands of years by many cultures, including ancient Anatolia, Rome, Greece, Ottoman, China, Japan, India, the Americas, the Middle East and the Mediterranean. Modern spa therapy can be traced to the development of "water cure" spas in 19th century Europe. Until the middle of the 20th century, spa therapy, including hydrotherapy and balneotherapy, remained popular but went into decline especially in the Anglo-Saxon world.
Hydrotherapy and balneotherapy have originated and developed as therapeutic interventions in spas where thermal and mineral waters emerge and can be found in great abundance. In fact, both hydrotherapy and balneotherapy involve the use of water in any form or at any temperature for the purpose of healing. Balneotherapy simply means the immersion of the whole or parts of the body in thermal mineral waters, but in a broader sense it is the use of natural sources such as thermal and mineral spring waters, gases, and mud as therapeutic elements. Hydrotherapy in its simplest definition is the therapeutic use of tap water or lightly mineralized water for the

attainment of health. In the last century, better understanding of the physical and chemical properties of water, the physiology of immersion and human movement has contributed in using hydrotherapy and balneotherapy as therapeutic interventions mostly in musculoskeletal conditions.

Spa therapy besides hydrotherapy and balneotherapy, employs a number of different treatment modalities, and creates a special therapeutic "atmosphere" of its own through the change in environment and lifestyle. Spa therapy has frequently been used interchangeably with hydrotherapy and balneotherapy by patients and health care workers alike. But, the terminology "spa therapy" should be reserved for balneotherapy that is combined with exercise, hydrotherapy, physical medicine or rehabilitation.

Hydrotherapy

In its current state, hydrotherapy became increasing in use when combined with exercise. And it is more narrowly focused in rehabilitation in the form of aquatic therapy most commonly in tap water (hydrokinesitherapy) or less commonly in mineral water (balneokinesitherapy). In comparison to land-based exercise, water can be used as an effective medium to achieve rehabilitation through its physical properties of hydrostatic pressure, thermal stimulation, and relaxing and unloading effects on muscles and joints respectively. As a rehabilitative measure, hydrokinesitherapy is predominantly used for locomotor diseases and rheumatic diseases as a primary modality in rehabilitation centers or as a secondary modality in spas. Hydrotherapy at the spas is occasionally administered in the form of hydrokinesitherapy (aquatic exercise in tap water). On the other hand, there are many other hydrotherapy techniques which are widely used in many spas in different countries including underwater massage, Scottish douche, and showers. In the latter forms, hydrotherapy achieves its beneficial effects primarily through mechanical and thermal stimulation.

There are several clinical trials published in peer-reviewed journals in English, which have shown the effectiveness of hydrotherapy when utilized as the primary treatment modality. Most trials that evaluate hydrokinesitherapy were done at rehabilitation centers with aquatic therapy as the primary treatment modality. At the spas, however, hydrokinesitherapy only has a supportive role because the primary treatment modality is still focused on serial mineral baths, even in patients with locomotor or rheumatic diseases. For this reason, European spas can only exist at location where mineral water can be found in great abundance.

Balneotherapy

Balneotherapy alone is usually the main and central therapeutic modality of total spa therapy.

As it uses "spa waters", it could only be given at spas. The definition of natural thermal mineral waters is based on the concentrations of the cations of Na, Ca, and Mg and the anions of SO_4, Cl, and HCO_3 exceeding 20% milival and the total mineralization over 1 g/L. The amounts of NH_4, NO_3, and NO_2 must be negligible, and the waters must be bacteria-free. Some elements, such as sulfur, fluoride and iodine, require contents of 1 mg/L or more and radon radioactivity over 666Bq/L. The adjective "thermal" requires that the temperature of the natural spring or welled water is 20°C or higher.

It was presumed that most mineral ingredients would be absorbed through the skin, which is an active immune organ and may play an important role in the mechanism. One might expect that minerals are absorbed through the skin with balneotherapy. There are data, however, that sulphur can be absorbed through the skin and may have an analgesic effect. Sulphur baths reduced pressure-induced, temperature-induced, and spontaneous pain in both normal subjects and patients with rheumatoid arthritis. In Freund's adjuvant-induced chronic arthritis of rats, swelling was reduced by sulphurous baths better than in tap water. Radon also penetrates the skin and even can be inhaled during radon bath treatment. This substance might have anti-inflammatory and analgesic effects.

Surprisingly, the debate whether minerals are actually absorbed from mineral baths continues even to the present time. Most physicians had argued against the notion of percutaneous penetration of mineral baths and any positive effects were the results of the physical properties of water. Only very recently, it has been possible to compare the effects of balneotherapy with those of warm tap water in double-blind trials in osteoarthritis of the knees and in rheumatoid arthritis. In other controlled but not double-blind trials, ambulatory balneotherapy was tried in local patients for chronic low back pain and fibromyalgia. In this way, the effect of a "spa atmosphere" was excluded.

SPA Therapy

The word "spa" comes from the name of a Belgian town where a thermal spring was discovered in the fourteenth century. Throughout the medical literature, it is common to come across the terminology spa therapy or "complex spa therapy" which essentially means that the patient is receiving balneotherapy (principal component) combined with hydrotherapy (minor component), exercise, mud therapy, physical medicine, and possibly even rehabilitation. To what extent do physical medicine, exercise and rehabilitation contribute to the overall favorable effect of spa therapy remains an enigma, considering the widespread use of spa therapy in Europe. Furthermore, to date it has not been clearly defined as to how many procedures and/or what procedures when combined with balneotherapy constitute complex spa therapy versus spa therapy and as a result, these two terminologies have been used arbitrarily. Recently there are efforts to establish a scientific basis for spa therapy especially in Europe. The problem in assessing the value of spa therapy is its complexity. Despite semantic, there is an important question that it not yet answered satisfactorily- is spa therapy or complex spa therapy more efficacious than balneotherapy?

The numerous clinical trials that have been conducted at the Dead Sea in Israel utilize mainly immersion in thermomineral waters (balneotherapy) combined with bathing in the Dead Sea (thalassotherapy), mud therapy, heliotherapy and climatotherapy. All the clinical studies in Israel are based on balneotherapy without the combined use of exercise, physical medicine and rehabilitation and yet the results have been favorable. Besides bathing in Dead Sea, there is evidence that balneotherapy with natural sulfur mineral water, which emerged in the Dead Sea Area, might have specific effects on clinical outcomes.

L055

UROGYNECOLOGICAL REHABILITATION PELVIC FLOOR INSUFFICIENCY PROFLAXIS AND EXERCISES

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According to ICS's definition; urine incontinence is the situation of involuntary urine discharge which brings social and hygienic problems with itself and can objectively be seen. It is an important symptom of the disfunctioning sub urine system. However, ***continence*** is the controlled ability of a person to urinate at the desired time and place. It is achieved when the intraurethral pressure becomes higher than the bladder pressure.

It is seen more frequently on females and its effect can be seen on all age groups. The urine incontinence can bring critical physicologic and social problems with itself whose prevalence changes between 10 to 30 percent.

The most widely seen type of urinary incontinence on females is the stress incontinence which is known as the involuntary urine discharge which may be seen during heavy lifting, coughing and laughing. Stress Urinary Incontinence (SUI) is the most frequently seen type of incontinence. Urinary incontinence can be seen in any age but its main effect has been observed on mid age females. Urodynamically, the real stress incontinence is an involuntary urine

loss without detrusor contraction where intravesical pressure exceeds the urethral closing pressure. The basic pathology is where the urethral pressure can not resist the internal bladder pressure when an increase is seen on the intraabdominal pressure. Main target in SUI treatment is to increase the urethral closing pressure. Previously, surgical treatment was seen as the basic solution, however since the treatment costs have been found hardly affordable more attention has been spent on conservative treatment methods. The aim of rehabilitation is to provide urethral stability by increasing the power of pelvic floor muscles. Surgical treatment is an effective method but requires a long convalescence period. It has been seen that the incontinence may repeat itself within a range of 10-40% on people having surgical operations due to stress incontinence, and also surgical complications has been observed on old aged patients. These can be described as widely seen disadvantages. This may cause one to have less social life and a decline in the life quality can easily be observed.

Risk Factors in Urinary incontinence: Age, gender, white race, excessive childbirth, connective tissue, smoking, obesity, constipation, uterus prolapsus, hysterectomy, radiotherapy, and urinary system infection can be listed as the risk factors of urine incontinence.

Incontinence types: Various situations can be described as reasons of incontinence.

Stress incontinence: Forms during activities increasing intraabdominal pressure. Meanwhile intravezikuler pressure also increases and incontinence is seen when the intraurethral pressure is exceeded. Reason is the weakness of pelvic floor muscle (P.F.M).

"Urge" incontinence: Also named detrusor instability. Detrusor shows an excessive shortening involuntarily. This is widely seen on patients with diabetes, stroke, demance, Parkinson and multiple sclerosis.

Mixed: It is a combination of stress and urge incontinence.

"Overflow" incontinence: Involuntary urine discharge with continuous or intermittent periods. Medical treatment can be useful on Urge and overflow type incontinences.

The first three types can be treated by physical rehabilitation and exercise. Urodynamic inspections should be done before a treatment and the correct diagnosis can be made definite.

Taking a detailed anamnesis of the patients and making a routine gynecological examination, urine samples and sediments are to be taken. Patients with urinary infections are taken to a treatment program according to the antibiogram. After these steps, giving the daily urinary forms to the patients taken under urodynamic inspection, they will be asked to note their water consumption and uncontrolled urine discharge for three days. Also, using a periometer, pelvic floor muscle power is measure and a pad test is applied.

Main steps of physical treatment and rehabilitation in urinary incontinence are exercise, electrical stimulation (ES) and biofeedback. Usage of vaginal cone is a less preferred physical treatment method when compared with these methods.

Rehabilitation Approach In Real Stress Incontinence:

1- Behavioral Treatment, a-) Diet, b-) Bladder Training, c-) Biofeedback, d-) Pelvic floor muscle exercises, vaginal cones.

2- Electrical Stimulation.

3- Medical Treatment; a-) Estrogen, b-) adrenergic drogs, c-) imipramin HCL, d-) B-Blockers.

Diet: Can be arranged looking at the bladder dairy. Food and drink with caffeine is limited. Coke, coffee, tea, chocolate and alcohol is taken out of the diet.

Bladder Training: With its high frequency, urgency and detrusor instability is useful for the urge incontinence caused by the bladder hypersensitivity. This is not suitable for the patients with stress incontinence and overflow incontinence.

First week, urinate interval can be 30-60 minutes. Even if the patient is not willing to urinate, he needs to be encouraged for it. Patient needs to follow a program for 6 weeks. Urinate interval is increased by approximately 30 minutes every week. Target is to reach 3-6 hours interval. Patient needs to get at least 4 lt. of water per day. This prevents constipations and dilutes the urine. Food with fiber needs to be consumed. Urine output must be between 1200-1600 ml. Patient makes urinates 4-6 times daily and 1-2 by night. To empty the bladder, it needs to make about 300 ml urinates.

Pelvic Floor Exercises:

Pelvic Floor Exercises was firstly described by Arnold Kegel in 1948. Kegel has taught his patients how to shorten their pubocksigeal muscles by palpation and has suggested them to repeat this at their homes.

The efficiency of pelvic floor muscle exercises on real stress incontinence has been verified by the latest researches. Short term results have been given in most of the studies. Researches involving long term studies have shown that continence has been continued on a major part of the patients and no symptoms have been observed. Exercise program needs to be followed for at least 6-8 weeks and after reaching a stable result it needs to be continued for lifetime. Physical outputs of the exercises will be seen after two weeks. Complains will reduce within 6 to 8 weeks and will recover within 6 months. In between the researches done it has been seen that the duration of the exercises changes between 6 weeks to 4 months. If the desired response is not taken, other reasons need to be investigated.

Contraction talents of the pelvic floor muscles can be evaluated by digital examination, biofeedback and perineometer. Before teaching a patient his/her exercises, he needs to be recommended to empty his bladder and choose clothes in which he can feel more comfortable. Patient, knees on flexion and while lying flat on back, head is slowly raised up. Stomach, hip and thigh muscles must be relaxed. Patient is taught to stretch and relax the pelvic floor muscles by vaginal touché or perineometer. ***Procedure:*** Legs should be straight and left on relaxed position. This way, it is possible to prevent the contraction of other muscles. PFM gets shortened as if it is about to stop the flow of urine and gas. Ideally it is kept in this position for ten seconds and is followed by an approximate ten seconds relaxation. Longer relaxation time may be required by weak patients. Breathing should not be stopped during shortening. Gluteal area, abdominal and thigh muscles should not be shortened. Shortening of abdominal area at the beginning may increase urine lost and cause tiredness. Patient is asked to continue these contractions during daily activities (Coughing, weight lifting and stretching for instance). Desired number is to reach 10 times slow contraction followed by 10 quick contractions. 6 or 8 sets of exercise in 24 hours or an exercise per hour is recommended. A set of exercise should take around 20-30 minutes. Patient should relax doing diaphragmatic breathing before going into a new series of exercises.

Effects of Exercises: Continuing less intense exercises for a long period causes hypertrophy formation on type I fibers, and this causes an increase of the support structure. Hypertrophy is a slow process. It is required to do intense exercise in order for more than eight weeks. Exercise does not cause contraindication. Most critical indication periods are prepartum and postpartum periods.

Although exercise can be used individually, it is recommended to combine them with biofeedback and ES and to follow the exercises for lifetime.

How shall we teach the exercises? : Today, exercises are accepted as the first choice in the treatment of SUI. Person sits or sleeps with legs slightly apart as thighs and knees supported. Methods are:

1. Stop Test: Only used in stress incontinence. At the second mixion of the day, during a moderate flow, patient is asked to stop urinating by controling pelvic floor muscles. It is not used as exercise since there is a risk of infection and emptying the bladder may get harder.

2. Digital Palpation: Person sits or sleeps with legs slightly apart as

thighs and knees supported. A second person in charge places his/her two fingers on the vagina and asks the patient to shorten the PFM in order to stop the urine and gas output.

3. Usage of Vaginal Cone: Its weight ranges between 20 to 90 grams. It could be used both for learning the exercises and for increasing the muscle power.

4. Usage of Biofeedback: This could be used for a few times in order to teach the exercises.

5. Electrical Stimulation: Patient learns which muscle is to be shortened after 3-4 sessions.

An inwards movement of PFM and periner during a contraction is a proof which shows that the exercise is properly being done. Selection of the most suitable patient is a key for a successful exercise program. Young age or premenopausal period, symptoms with short periods and stress incontinence increases the chance of achieving a successful program. Patient needs to be well motivated. There should be a good cooperation with the physiotherapist. Exercise program needs to be followed in order and continued properly. Muscle power needs to be measured monthly in order to provide good motivational support to the patient. She also needs to be called periodically for a control for the modification and improvement of the program.

B-Electrical Stimulation:

Faradic current which has low frequency and interferential current with moderate frequency is used in Electrical Stimulation. Faradic current method has not been quit since it has been forming unbearable pains. Distribution of moderate currents is more stable and diffuses deeper. Application of interferential current can be done by electrodes or vaginal probes. Usage of vaginal probe is a highly preferred method. Effect ***Mechanism:*** Electrical stimulation applied to the perine area through intravaginal way, provides an increase in the urethral stinkteric function and a decrease in bladder contractility. Direct stimulation of the pudental nerve afferent fibers electronically causes a polysynaptic reflex response. Impulse reaches to the sacral nerve roots and from there goes back to the pelvic floor muscles by the afferents of the pudental nerve. As a conclusion, a contraction is formed in the urethral lined sphincter by pelvic floor muscles and the urethral closing pressure increases. Effective frequency for this effect is between 20 to 50 Hz. Another result of the reflexive response is the detrusor inhibition. Electrical Stimulation: It increases the muscle power by muscle contraction. Urethral pressure increases by the direct stimulation of the pudental nerve. Detrusor becomes inhibited by the reflexive stimulation of the pelvic nerve. Local circulation, cortical conscious and adrenergic activity increases but cholinergic activity decreases. Short (Acute) Term FES: Is a popular method of today. An alternate current of 50 Hz, 1.5 ms, and 90 mA with vaginal probe, a biphasic spike pulse of 20 Hz, 0.75 ms and 40 mA needs to be given for an effective treatment.

Indications of Electrical Stimulation: Stress incontinence, urge incontinence, mixed incontinence, detrusor hyperreflex, naturopathic urinate disfunctionality, frequency, urinate disfunctionality due to urethral instability.

Contraindications of Electrical Treatment: Critical vaginal prolapsus, vaginal infection, heavy menstrual bleeding, cardiac aritmy, cardiac pacemaker, urinary retention, vesikoutethral reflu. In order to succeed with electrical stimulation: Strong sacral reflex arc, minimum muscle denervation and should be combined with active exercises.

Electrical Stimulation is successful on Urge incontinence cases. PFM exercises are not as effective as ES on detrusor instability. The way electrical Stimulation is applied: It is preferred for cases where the muscle power is less than 3/5 '. Frequency is kept between 5 to 10 Hz to inhibit bladder contraindications in urge incontinence. Urethra contraction needs to be activated in stress incontinence and the frequency should be kept between 10 to 50 Hz. Stimulation goes for 5 seconds which should be followed by a 10 seconds relaxation. Relaxation period gets longer for the weak muscles. Current intensity is adjusted according to the tolerance of the patient, and has an average value of 45 mA. Pulse amplitude ranges between 20 to 700 Msn and its duration ranges between 0.1 to 1 msn. Following 2-3 sessions per week, a total number of 12 sessions' treatments are applied. This number can be taken up to 16-18 sessions. Total treatment time is about 20-30 minutes. Treatment duration takes shorter at the beginning sessions and in urge incontinence where 15 minutes should not be exceeded.

Biofeedback:

Biofeedback is to show the physiologic events as visual and auditory by the help of a monitor and a sound system. Increase of the muscle power is higher since this is an active method. Since there is no visual feedback in exercise and ES, undesired muscles can get shortened.

Usage of biofeedback in urinary incontinence: It is used on patients with detrusor instability, in order to teach the voluntary inhibition of the detrusor contractions, relaxation of abdominal muscles and the contraction of pelvic floor muscle. Patients with stress incontinence can only learn pelvic muscle contraction without abdominal muscle contraction. Success of the rehabilitation by biofeedback does not only depend on the selection of the method but mainly depends on the motivations and talents of the patient and doctor.Biofeedback as a rehabilitation method is generally combined with other behavioral treatments.

Evaluation of treatment in urinary incontinence and the most important of follow up criteria are as follows: decrease in uncontrolled urinating or its complete disappearance. According to some authors, patient's such expression is accepted as the most important result. Urinary dairy for three days is, the objective and subjective incontinence scoring, abdominal loosing pressure gained through urodynamic inspection and other evaluation criteria. Patient's evaluation for the success of the treatment is processed where she is asked to express her opinions with one of the following explanations as, completely treated, better than before or no treatment achieved. These results are accepted as treatment parameters for an input to an evaluation.

Conclusion: Conservative treatment with physical treatment and exercise must definitely be tried out on urinary incontinence excluding cases where extreme anatomic disfunctionalities exist or surgical treatment is required. Treatment range on patients with stress incontinence has been found between 59 % to 70 %.

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L056

URINARY DYSFUNCTION

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The lower urinary tract consists of the urinary bladder and urethra. Functionally it can be conceptualized as a reservoir and a sphincter that is ideally suited for its role in the storage and excretion of urine. The bladder spends most of its time in the 'off' mode – that is, it passively fills with urine without alerting its owner of its current state of fullness. As the bladder fills, the muscular walls relax to accomodate an increasing volume of urine with little or no change in intravesical pressure. Continence is maintained by the urethral sphincter through both passive and active mechanisms. Periodic elimination of urine is normally under voluntary control when a series of coordinated actions occur, i.e. urethral relaxation and detrusor contraction.

Alterations of normal physiology or anatomy or both may present with a variety of symptoms. It may be helpful conceptually to categorize lower urinary tract symptoms as follows:

Sensory Disorders (A

Urgency, frequency, nocturia, dysuria, bladder pain, decreased sensation.

Alteration of Urinary Continence (B

Stress urinary incontinence, urge urinary incontinence, mixed urinary incontinence, nocturnal enuresis, continuous urinary incontinence

Abnormal Bladder Emptying (C

Hesitancy, slow stream, intermittent stream, straining, incomplete bladder emptying, postmicturition dribbling

Approach to the Patient with Lower Urinary Tract Symptoms:

A detailed history of the patient's complaints in an orderly and systematic fashion; a comprehensive review of the patient's medical, surgical and gynecologic history. Information should be collected regarding the patient's social, sexual and dietary habits, as well as the present voiding habits.

Establishing the impact of the patient's symptoms on her quality of life (QOL)

Lower urinary tract symptoms cannot be used to make a definitive diagnosis, but rather help to guide the clinician along an appropriate path of investigation.

Physical examination, a focused neurologic examination should be included. It is helpful to examine the patient first with a full bladder. This can allow for direct clinical observation of stress incontinence when the patient is asked to bear down forcefully and cough. The main focus of physical examination will be pelvic organs and lower abdomen. The clinician should determine the presence and stage of pelvic organ prolapse.

The physical examination should be concluded with a discussion of the presenting symptoms and physical findings with the patient.

A postvoid residual urine volume should be determined usually by simple catheterization or by ultrasonography. This specimen can also be sent for microscopic examination and for culture, if indicated.

The above evaluation represents the basic initial evaluation for most patients complaining of lower urinary tract symptoms. Armed with this data, the clinician will have sufficient information to formulate a preliminary diagnosis and course of treatment.

However, if the patient's history is at odds with findings on physical examination or laboratory tests or if the tests has not reproduced her symptoms, further evaluation is warranted. Consideration should be given to referral for special evaluation.

Treatment must be individualized based on specific symptoms. Many options for treatment; surgical and nonsurgical treatments (pharmacologic therapy, behavioral therapy, pelvic muscle rehabilitation, physical therapy etc) should be discussed with the patients. The clinician can recommend one or more forms of management, either simultaneously or sequentially depending on the indication, and the patient's preference and level of motivation.

L057

UTILIZATION OF AEROBIC EXERCISE TRAINING IN REHABILITATION MEDICINE

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Exercise is an indispensable component of therapeutic interventions in a wide spectrum of musculoskeletal problems involved in physiatric practice, thus training in PM&R practice requires adequate knowledge and skill in prescribing all types of therapeutic exercise. It is also well-known that contemporary interventions in PM&R practice require maximum patient participation. Despite the established habit of prescribing numerous types of exercise (i.e strengthening / stretching / open or closed kinetic chain / isometric exercises etc) for most of the musculoskeletal problems, prescription of aerobic exercise training has not been given adequate attention it deserves, whereas nearly every single patient has a functional aerobic impairment which has to be overcome, due either to his/her disease, to a sedentary lifestyle, or to aging process.

This lecture aims to emphasize the importance of aerobic exercise in physiatric practice, an opinion rising from the experiences of the author in a cardiac rehabilitation unit where it is observed that aerobic exercise training -as the integral part for phase 2 cardiac rehabilitation- serves as a successful adjunctive treatment modality for many comorbidities other than coronary heart disease.

Physiatrists mostly deal with elderly patients with numerous comorbidities and endeavour to enhance their health related quality of life. WHO defines active ageing as, 'a process of optimising oppurtunities for physical, social and mental well-being throughout life course in order to extend life expectancy'. A typical elderly patient has not only common systemic disorders such as cardiovascular and/or peripheral vascular disease, diabetes mellitus, obesity and hypertension, but he/she also most probably has degenerative disease of spine and/or peripheral joints which lead to chronic low back and/or joint pain. Thus, leading an inactive lifestyle because of the limited mobility caused by these diseases may also lead to a cycle of progressive deconditioning, muscle weakness and decreased social role functioning, consequently giving rise to depression which perpetuates the cascade of inactivity. Spinal stenosis, osteoporosis and fibromyalgia are other diagnosis encountered commonly in our patient population.

Aerobic exercise training reverses the cycle of deconditioning, weakness and functional loss associated with the conditions mentioned above. Modification of cardiovascular risk factors such as diabetes, obesity and hypertension is also accomplished via exercise. In addition to the positive physiologic effects of exercise training, exercise interventions for elders have been shown to reduce the risk of falls improving balance, enhance self-esteem and improve mood with cognitive skills. The similarities between biologic changes of the musculoskeletal system from ageing may be prevented or at least modified with increased physical activity. Increased flexibility and endurance with exercise contributes to quality of life and inhibition of further bone loss in patients with osteoporosis, lowers the morbidity and mortality due to fractures. Protective effects of aerobic exercise against colon cancer and gallstones are other probable benefits though mentioned seldomly.

The growing knowledge about our patient population who need neurologic rehabilitation such as spinal cord injury and stroke also indicate the positive effect of aerobic exercise training in both situations.

As a conclusion, nearly every patient we deal in our daily practice is a candidate for aerobic exercise training for at least one indication. Physiatrists should be sensitive upon underutilizing aerobic exercise training and should give much emphasis to this issue while counseling their patients and planning therapeutic exercise.

L058

DETERMINING THE INTENSITY OF EXERCISE IN CARDIAC REHABILITATION: RELATION WITH PEAK OXYGEN CONSUMPTION

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Exercise training in cardiac rehabilitation (CR) reduces overall mortality, cardiovascular mortality and rates of sudden death although makes no difference in the incidence of subsequent myocardial infarction (1,2). Moreover, exercise training improves physiologic and psychologic indices, including neural control (3,4), quality of life (5,6), exercise tolerance (7-9), left ventricular function (10,11), skeletal muscle physiology (12,13), peripheral blood flow, and endothelial function (14-16). High intensity exercise, defined as more than 70% VO_{2max}, confers greater benefit and results in a higher left ventricular ejection fraction (17-19). According to the guidelines of American College of Sports Medicine cardiac patients should exercise above a minimum intensity (threshold) to achieve a cardiorespiratory training effect and these guidelines suggest that training threshold for cardiac patients should be between 40-50% of oxygen uptake (VO_2) reserve (20) which is the difference between resting and maximum oxygen uptake. An appropriate intensity range for aerobic conditioning in healthy populations is widely recognized to be 50 to 85% of the maximal or peak oxygen uptake level whereas for patients with heart disease, 40 to 60% is commonly recommended (20). In several studies it was shown that mild to moderate (60% of HR reserve) intensity exercise or just brisk walking at the 70% of measured maximal HR was associated with improved physiologic outcomes and was proved to be sufficient to achieve cardiorespiratory and health benefits (21-24). For cardiac patients with different diagnosis recommended exercise intensity also differs. For example, patients with heart failure defined approriate intensity as a heart rate is $\pm$10 of the HR measured at ventilatory threshold (25). For patients with hypertension, reported studies support that lower intensity exercise (<70% VO_{2max}) is more effective than high intensity (26). Thus, it is hard to identify a certain threshold for the cardiac patients and the exercise program should be tailored individually. Also, exercise intensities below this value still may be an effective training stimulus, especially for the extremely deconditioned subjects. It should be kept in mind that to increase the peak VO_2 value is not the ultimate goal for every patient in CR and regular exercise may improve general well-being, quality of life, psychologic status, and exercise endurance without a prominent increase in peak VO_2.

Usually the intensity of exercise training is calculated from peak exercise capacity (27). A percentage of maximum workload or VO_2 during ergometry or of the heart rate (HR) reserve are used to determine the intensity. Frequently used method is the Karvonen formula which is based on HR reserve which is the difference between HR at peak exercise and HR at rest (28). It is not certain that training HR could be reliably calculated from Karvonen formula and some authors suggest that individual exercise prescription for CR should be determined directly and not indirectly from HR parameters (29). In cases where it is hard to follow the HR or where HR responses are affected by drugs, such as β-blockers, it is not appropriate to rely on heart rates for determining exercise intensity.

Another method to prescribe a safe and effective exercise intensity for physical conditioning is by ratings of perceived exertion (RPE). It has been suggested by Borg that some people have difficulty in counting HR, or focus too much attention on pulse counters (30) and his scale; Borg scale of RPE, has been shown to have a high

correlation with HR (30,31). However, these studies did not necessarily show validity in the sense that a given number on the RPE scale consistently matched with a physiologic intensity, e.g., VO_{2max}. For an effective training RPE should be between 12-16 (32), but in some studies this method of exercise prescription was shown to have limitations and could result in dangerously high heart rates if used in CR programs (33). Also, significant interindividual variability in RPE was observed at both different exercise intensities and different population groups (32). Generally, patients are able to gauge their exercise intensity reasonably by using RPE, but exercise capacity increases more when intensity is controlled by direct HR monitoring (34).

Although considered as the "gold standard" for exercise prescription, the measurement and application of oxygen uptake in CR generally are not available everytime. Thus, HR techniques commonly are used to prescribe exercise intensity because the two physiologic responses generally are related linearly (20). However, the results of a study indicate that using reserve HR+20 or RPE 11-13 to prescribe exercise intensity results in substantial intersubject variability and raises questions about the safety and efficacy of these approaches (35). There is still some debate on the appropriate intensity and appropriate method of exercise prescription and follow-up and these questions will further be discussed.

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PULMONARY REHABILITATION IN NEUROLOGICAL DISEASES

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Pulmonary rehabilitation is the art and method of systematized, multidisciplinary care. The roots of pulmonary rehabilitation extend back to the period when tuberculosis is quite prevalent before the 20th century. Pulmonary rehabilitation is a process which systematically uses scientifically based diagnostic and treatment options to achieve the optimal daily functioning and health related quality of life of individual patients suffering from impairment and disability due to chronic respiratory disease as measured by clinically and/or physiologically relevant outcome measures. The multidisciplinary pulmonary rehabilitation team consists of physiatrists, therapists, nurses, nutritionists, social workers, case managers and psychologists.

Patients with COPD, restrictive lung disease and sleep disordered breathing have been shown to benefit from pulmonary rehabilitation. Finally there is a group of neurological disorders that pulmonary rehabilitation principles can also be applied. In this clinical conditions, respiratory dysfunction may hamper progress in rehabilitation process, effect outcome measures and complicate these disorders such as spinal cord injury, stroke, multiple sclerosis and Parkinson's disease.

Respiratory abnormalities have been noted in patients with Parkinson's disease (PD) since its initial description in 1817, and these respiratory problems commonly contribute to morbidity and mortality. A variety of respiratory problems such as aspiration pneumonia, respiratory dysrhytmias; whether or not associated with levodopa therapy, chronic or recurrent airflow limitation, acute respiratory failure and lung infection, restrictive neuromuscular spirometric pattern, upper or lower airway obstruction and diminished strength of the respiratory muscle have been documented in PD.

Different possible mechanisms such as involvement of the upper airway striated muscles, decreased arterial PO2, L-Dopa induced dyskinesias, systemic defect in mitochondrial function, global motor disability, cough reflex impairment have been postulated to explain the respiratory dysfunction in PD.

EMG abnormalities of laryngeal muscles have been reported in patients with PD. The diaphragm seems to be spared in PD patients. Although diaphragmatic EMG was essentially normal, intercostal EMG demonstrated continued activity during expiration when these muscles normally are electrically quiet.

It is commonly accepted that the motor cortical representation of diaphragm and intercostal muscles is bilateral. Thus, they are little influenced by unilateral corticospinal lesions in stroke patients. However, it has been shown that hemiplegia due to cerebrovascular disease affects the function of the respiratory muscles on the paralysed side.

Chest roentgenograms of stroke patients showed an elevation of the diaphragm on the affected side. Furthermore, surface recordings of respiratory muscles showed a reduced amplitude of the EMG on the paralysed side during voluntary hyperventilation. Recently it has been found that there was no bilateral motor representation of each hemidiaphragm.

Hypoxia and significant reduction in the values of FVC, FEV1, PEF, FEF 25-75%, VC, FIVC has been reported in hemiplegic patients compared to the controls. Significant relationship between respiratory dysfunction and motor disability scores were also determined in many studies. It is proposed that ventilatory musle weakness, altered chest movements, chest wall spasticity and contractures might be account for the respiratory dysfunction seen in hemiplegic patients.

Respiratory complications are major causes of morbidity and mortality in patients with cervical and high thoracic spinal cord injury. The greatest increase in mortality occurs in the first 6 months to 1 year after trauma. After the first 1 to 2 years, the mortality curve parallels that of normal individuals. Paralysis of respiratory muscles is directly associated with restrictive ventilatory impairment, the severity of which correlates inversely with the level of spinal lesion. SCI with the neurologic level C3 through C7 generally results in a weakened diaphragm and paralysis of the external (parasternals) and internal intercostals and abdominal musculature, along with partial to complete denervation of the most of the accessory muscles of breathing, all resulting in significant impairment of respiratory function. Additionally, the individual with cervical SCI is unable to generate a cough forceful enough to clear mucus secretions and infection.

The profile of pulmonary function tests of individuals with complete tetraplegia is typically that of a restrictive ventilatory deficit. The TLC is reduced, the RV is increased. The MEP, MIP and maximal voluntary ventilation is also reduced. The work of breathing is increased and the diaphragm is prone to fatigue, particularly in those patients with high cervical cord injury.

In patients with SCI below C4, motor innervation of the diaphragm and most of the accessory muscles of breathing will be intact but there will be partial or total paralysis of the intercostals and abdominal musculature. Denervation of the intercostals and abdominal musculature results in changes in the mechanics of the lungs and thorax, such as a reduction in lung compliance and a strong restrictive ventilatory impairment. Furthermore, the efficiency of the unaffected muscles may be decreased due to instability of chest wall and due to an inactive lifestyle. Obstructive pulmonary dysfunction is also of concern, not only because airways may collapse or be closed by mucus, but also because they may be especially susceptible to constriction.

Respiratory complications are common in the terminal stages of multiple sclerosis(MS) and contribute to mortality in these patients. When respiratory motor patwhays are involved, respiratory muscle weakness frequently occurs in MS and may impair the performance of coughing. The causes of respiratory dysfunction is divided into five categories in multiple sclerosis patients; respiratory muscle weakness, bulbar dysfunction, obstructive sleep apnea, abnormalities of respiratory control and paroxysmal hyperventilation. Although it is well established that weakness of the respiratory muscles produces a restrictive ventilatory defect, the degree of muscles weakness and pulmonary function are poorly related. Pulmonary function as essentially normal in ambulatory patients, but was reduced in wheel-chair-bound and particularly in bedridden patients. Respiratory muscle weakness was observed in a number of studies. Contrary to pulmonary function tests, respiratory muscle function was also reduced in patients with mild disease.

Patients with amyotrophic lateral sclerosis(ALS) invariably develop respiratory muscle weakness and most die from pulmonary complications. This is due to weakened respiratory musculature resulting in respiratory failure, ineffective cough and failure to protect the lungs from aspiration. Weakness of the diafragma is invariably present as patients reach significant levels of disability. Respiratory muscle weakness in ALS can lead to nocturnal hypoventilation, resulting in sleep disturbance and daytime somnolance. Elimination of airway secretion is a major issue in the care of patients with ALS.

Approximately 90 % of patients with Duchenne Muscular Dystrophy die secondary to chronic respiratory insufficiency. Contributory

factors include restrictive pulmonary disease, chest wall mucle weakness and scoliotic deformity.

In patients with prior polio, respiratory muscle weakness and chest wall deformities such as scoliosis can lead to a restrictive ventilatory function with a reduction in VC, FVC and an increase in RV and hypoventilation. Hypoventilation causes hypercapnia and symptoms such as dyspnea and daytime fatigue, which might restrict the level of activity.

Despite the presence of typical abmormalities in respiratory function, most patients with neurologic disease do not report respiratory symptoms. Besides the state of the respiratory system, metabolic demands are important in the development of respiratory failure. Ambulatory individuals require better ventilatory function during daily life than those who have extensive paresis and are confined to wheelchairs and whose sedantary life consequently mask their ventilatory impairment until increased demands appear, as during infection or strenious activity. Therefore, respiratory system should be closely monitored as early identification of problems.

The components of comprehensive pulmonary rehabilitation program include overall team assesment in a multidisciplinary fashion, education, breathing retraining, airway clearance techniques, supplemental oxygen therapy, exercise training, nutritional therapy and follow-up.

Before entry to the rehabilitation program, chest radiograph, pulmonary function testing (PFT), quality of life indicators, oxygen saturation, exercise testing are performed or measured in order to assess the pulmonary rehabilitation patient.

PFT makes it possible to evaluate future changes in pulmonary status and lung disease, and helps to determine possible impairments, and to identify whether a patient has a restrictive or obstructive pattern.

A baseline chest radiograph will help identify the possible coexistence of pulmonary pathology (e.g.,pneumonia or atelectasis). Oxygen saturation, via oxygen pulse oximetry at rest and with exercise, may help to establish the need for oxygen supplementation. Either General Health Questionnaires such as The Sickness Impact Profile (SIP) or Disease –Spesific Questionnaires such as Chronic respiratory Questionnaire can be used for the quantification of the impact of disease on daily life and well-being.

Exercise testing is very important for accurate measurement of exercise tolerance and to demonstrate changes overtime. Exercise testing for pulmonary rehabilitation can vary from a simple, timed walk measurement (e.g. six minute walk test) to complex incremental cardio-pulmonary exercise testing on a stationary bicycle, arm crank ergometer or treadmill. Exercise training is an essential feature of the pulmonary rehabilitation process. Many of the effects of pulmonary rehabilitation have been linked to the improvement of strength, endurance and the efficiency of the body's muscle function. Endurance training, upper extremity and ventilatory muscle strengthening, and breathing retraining can be used for exercise training.

Pursed lip breathing (PLB), air shifting technique, diaphragmatic breathing and glossopharyngeal breathing(GPB) are the four major breathing retraining techniques that are used widely today. The goals of breathing retraining tecniques are:

1. To restore the diaphragm to a normal position and function,
2. To decrease the respiratory rate,
3. To diminish the work of breathing,
4. To reduce dyspnea and improve exercise performance.

PLB aims to improve expiration both by prolonging expiration and by preventing airway compression and airway collapse. PLB is a moderately active expiration through the half-opened lips inducing peak expiratory mouth pressures of about 5 cm H2O. PLB reduces respiratory rate, dyspnea, and improves tidal volume and oxygen saturation.

Air shifting techniques involve taking a deep inspiration that is held with the glottis closed for 5 seconds, during which time the air shifts to lesser ventilated areas of the lungs. The subsequent expiration is via PLB. These techniques may be useful to decrease microatelectasis.

Diaphragmatic breathing aims to improve chest wall motion and ventilatation distribution, decrease energy cost of breathing, decrease the contribution of rib cage muscles, decrease dyspnea and improve exercise performance. To make this maneuver, the patient is told to move the abdominal wall exclusively during inspiration and reduce upper rib cage motion. Two studies observed a decrease in EMG activity of the sternomastoids and of the pectoralis major muscle during diaphragmatic breathing. Decreased respiratory rate and increased minute ventilation and tidal volume associated with improved blood gases were also reported after diaphragmatic breathing training.

The time of ventilatory assistance can be decreased by GBP. GBP can be used to take deep breaths, shout and increase the effect of coughing, even in individuals who have no measurable VC. Intact oropharyngeal muscles are necessary for GBP. The patients is instructed to take a deep breath and then augments it by GBP.The tongue and pharyngeal muscles project boluses of air past the vocal cords. The vocal cords close with each gulp.One breath consists of six to nine gulps of 60 to 200 ml each.

The methods of ventilatory muscle training are voluntary isocapneic hyperpnea, inspiratory resistive loading and inspiratory threshold loading. Techniques of voluntary isocapneic hyperpnea provides low tension and high level of repetetive activity for the diaphragm and other inspiratory muscles. During inspiratory resistive breathing, the patient inspires through a mouth piece and adapter with an adjustable diameter. This resistance is flow-dependent. However, it became apparent that many of the subjects of inspiratory resistive training consciously or unconsciously reduced their inspiratory flow rates and lenghthened their inspiratory time to reduce the severity of the imposed loads. More recently a flow-independent resistance device was developed. Threshold loading device has a valve that opens at a critical mouth pressure.

Ventilatory muscle training has been shown to improve exercise capacity more than exercise training alone, decrease dyspnea and nocturnal desaturation time and increase endurance capacity of ventilatory muscle.

Many neck, arm, and shoulder muscles are also accessory muscles of respiration. Thus, in patients with respiratory problems, these muscles participate both in breathing activities and in the positioning or moving of the upper chest and upper extremity for daily living activities. The overlap in function explains why patients with lung disease are particularly shorth of breath when performing upper extremity activities of daily living.

There are many types of upper extremity exercises such as arm crancking, simple anterior elevation of the arms, gravity resistance exercises, swimming and rowing. It has been shown that training of the arms in healthy subjects increases VO2 max, and decrease ventilatory requirement at identical work rates.

Many authors observed significant improvements in specific upper extremity performance tests after upper extremity training in comparison to control group.

Treadmill, upper or lower extremity ergometer can be used for endurance training. Endurance training involves a larger muscle mass working at moderate intensity for a longer period of time. This type of exercise is often carried out by starting with a comfortable exercise level for the pulmonary patient, which should allay the patient's fears of worsening is dyspnea and hypoxemia. Exercise intensity is gradually increased to maximal exercise as tolerated.

Exercise intensity can be described using target heart rate, maximum oxygen consumption, and the Borg rating of perceived exertion scale. This indicator is usually scored 0 to 10, with 0 indicating no discomfort or restlessness and 10 indicating extremely severe exertion or dyspnea.

The exercise sessions will often include at least 20 minutes (and preferably 30-60 minutes) of continuous activity. 3 to 5 days weekly exercise session frequency is the goal for the most pulmonary rehabilitation programs. The training program longer than 3 weeks (and preferably 5-10 week) is required to achieve a physiologic training effect. According to a recent meta-analysis, the minumum duration of rehabilitation programs is usually three months.

Oxygen therapy plays an important part of pulmonary rehabilitation and can be used in the following ways;

1) Long-term oxygen therapy is prescribed to correct chronic hypoxemia and to improve oxygen delivery to vital organs. It is essential that the PaO2 is corrected to at least 8.5 kPa (SaO2 >92%)

2) Ambulatory oxygen therapy is also used to correct exercise hypoxemia, improve exercise capacity and also reduce disabling breathlessness. Some patients without resting hypoxemia can develop significant desaturation during exercise and may benefit from ambulatory oxygen. It aims to keep the SaO2 above 90%.

3) Supplemental oxygen therapy may also be used during physical training as part of a pulmonary rehabilitation programme. It is used in patients who show more severe exercise hypoxemia, but are not candidates for long-term oxygen therapy.

Forced expiratory manoeuvres, huffing and coughing, are considered the cornerstone of airway clearance techniques, and are an essential part of almost every combination of treatment modalities. Other airway clearance techniques are postural drainage, percussion and vibration, positive expiratory pressure mask and flutter breathing.

A recent review of 48 pulmonary rehabilitation studies indicated that consistent improvements included decreases in the ventilatory equivalent or the ventilation/oxygen consumption ratio, increases in work efficiency (external work per unit of oxygen consumed) and, thus, in exercise tolerance, ambulation capacity, generally well-being, dyspnea tolerance and quality of life measures.

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L060

A GLOBAL APPROACH TO CARDIAC REHABILITATION

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Cardiovascular diseases are the leading cause of mortality and morbidity. A large number of persons with cardiovascular diseases who survive constitute a reservoir of cardiovascular morbidity, requiring medical services which would help them reduce the risk of subsequent morbidity and mortality through risk factor modification and improvement of their quality of life.

What is cardiac rehabilitation?

Cardiac rehabilitation is defined by the World Health Organization as "the sum of activities required to influence favourably the underlying cause of the disease, as well as the best possible, physical, mental and social conditions, so that they (people) may, by their own efforts preserve or resume when lost, as normal a place as possible in the community".

Indications for Cardiac Rehabilitation

Diagnoses and therapeutic interventions for which cardiac rehabilitation is useful include ischemic heart disease, recent myocardial infarction, post-coronary artery bypass surgery, post-percutaneous transluminal coronary angioplasty, post-valve surgery, post- cardiac transplant, congestive heart failure. Patients with arrhythmia, with a pacemaker, internal cardiac defibrillator, left ventricular assist device, and also patients with cardiomyopathy may require cardiac rehabilitation.

Phases of Cardiac Rehabilitation

Cardiac rehabilitation services are divided into 4 phases beginning with phase 1 that is initiated while the patient is still in the hospital, the key elements of which are medical evaluation, education, risk factor assessment, mobilisation, and discharge planning. Phase 2 is the early post discharge period with support provided by home visiting and telephone contact and by supervised use of a self-help program designed to reduce anxiety, depression and hosital readmission rate. Phase 3 is a structured exercise program either in a hospital setting or in the community or both with educational and psychological support and advice on risk factors. This phase is what most people understand as cardiac rehabilitation. Phase 4 is the maintenance phase with patient-monitored continuation of the aerobic exercise program, risk reduction strategies, and activity/work modifications in a minimally supervised or unsupervised setting. Some countries recognise three phases only by combining the early post discharge and exercise training as Phase 2.

Components of Cardiac Rehabilitation

Although reviews of cardiac rehabilitation describe two types of cardiac rehabilitation—"exercise only" and "comprehensive cardiac rehabilitation", according to the American Association of Cardiovascular and Pulmonary Rehabilitation, all cardiac rehabilitation programs should contain specific core components that aim to optimize cardiovascular risk reduction, foster healthy behaviors and compliance to these behaviors, reduce disability, and promote an active lifestyle for patients with cardiovascular disease and that programs that consist of exercise training alone are not considered cardiac rehabilitation.

Comprehensive cardiac rehabilitation programs have two major components:

1.Exercise training designed to improve the patient's tolerance for physical activity and ability to perform activities of daily living.

2. Education, counseling, and behavioral interventions to help patients stop smoking, lower their blood pressure, change their eating habits, lose weight, improve their cholesterol levels, and improve their psychosocial well-being.

Contraindications of Cardiac Rehabilitation Services

Cardiac rehabilitation services are contraindicated in patients with severe residual angina, uncompensated heart failure, uncontrolled arrhythmias, severe ischemia, LV dysfunction, or arrhythmia during exercise testing, poorly controlled hypertension, hypertensive or any hypotensive systolic blood pressure response to exercise, and unstable concomitant medical problems (poorly controlled diabetes, ongoing febrile illness, etc.). Those patients can undergo retesting for exercise prescription after correcting these abnormalities through medical therapy, revascularization by angioplasty or bypass surgery, or electrophysiologic testing and subsequent antiarrhythmic drug or device therapy.

Utilization of Cardiac Rehabilitation Services

Although the provision of cardiac rehabilitation services is increasing in many countries due to the accumulating scientific evidence establishing the benefits of cardiac rehabilitation, patient participation rates in cardiac rehabilitation have remained poor. The majority of eligible patients do not participate in cardiac rehabilitation.

Conclusion

Cardiac rehabilitation has been demonstrated to result in a decrease in cardiovascular morbidity and mortality. The accumulative evidence strongly supports the use of cardiac rehabilitation for the treatment of patients with heart disease. Cardiac rehabilitation services should be an essential component of the management of eligible patients with coronary heart disease and heart failure, as a key point for reducing further disability.

However, there is significant underutilisation of cardiac rehabilitation programs. Many patients are not offered cardiac rehabilitation. There is a need to make cardiac rehabilitation more widely available.

L061

ACUTE CARDIOLOGIC REHABILITATION, THE PROBLEMS AND THE NEW APPROACH TO THE EXERCISE THERAPY

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Rehabilitation therapy of patients with coronary heart disease aims at reducing cardiovascular risk factors and at maintaining reduced risk factor levels (1).

The percentage of participation in inpatient rehabilitative care depends on the severity of the heart disease. After PTCA only 13,8 % of the patients, whereas after myocardial infarction, bypass and valvular operation approximately 98 % participate in acute inpatient rehabilitative care (2).

The new results of German Heart Association show that the time between dismission from the hospital and the begin of rehabilitation became shorter in the last five years. In myocardial infarction a decrease from seven to one day, in PTCA from 18 to two days and, in bypass operation from eleven to four days is reported (2).

Because of this reason, we have more complications in acute cardiological rehabilitation. According to the statistic results, atrial fibrillation (AF) and supraventricular tachycardia are the most common problems (3). Atrial fibrillation is an arrhythmia with high morbidity and mortality. Restoring sinus rhythm is one of the principle objectives in its management. Heart rate control, reduction of symptoms, and prevention of embolism are major goals of treatment. Medical and electrical cardioversion was performed for termination of the arrhythmia. An oral loading dose of an antiarrhythmic drug for cardioversion of atrial fibrillation could be an option, due to its simplicity. Digoxin, non-dihydropyridine calcium channel antagonists, beta-adrenoceptor antagonists (beta-blockers), and amiodarone are the pharmacologic agents most commonly used to achieve rate control. The use of antiarrhythmic drugs for the maintenance of sinus rhythm depends on several factors: (i) the nature of the arrhythmia (first attack, paroxysmal AF with frequent attacks, paroxysmal AF with infrequent attacks, or persistent AF); (ii) the associated symptoms; (iii) and the risk of severe adverse effects associated with the chosen drug. If the administration of an antiarrhythmic drug is appropriate, the choice of the drug must be tailored to the specific characteristics of the given patient. All class I antiarrhythmic agents should be avoided in patients with structural heart disease. Because of this reason we use mostly class III antiarrhythmic agents in the rehabilitation (4,5).

The other alternative therapy is electrical cardioversion. Thromboembolism may complicate electrical cardioversion (ECV) of atrial fibrillation/flutter (AF). The use of 3 weeks of warfarin before ECV results in a substantial reduction of thromboembolic complications (6).

In German Crushmann Rehabilitation Clinic, 500 electrical cardioversions were performed last year and sinus rhythm was restored in 84 % (7)

Angina Pectoris is an other problem in acute rehabilitation. Most of them are harmless. In these cases, it is necessary to make ECG and troponin test. If the results don´t prove myocardial infarction, we use exercise ECG to find out if ST depression exist (8).

Exercise ECG testing is the most widely used method for detecting myocardial ischaemia. Attention to absolute and relative contraindications and criteria for test abortion is mandatory. Today many of the rehabilitation clinics use bicycle ergometry. The bicycle ergometry work was performed applying 25 or 50 W intensity in the beginning and increasing the power every minute by 25 W. The following functional parameters were estimated in this study: heart rate, arterial blood pressure, JT interval, ST segment depression at rest and in each level of functional load (8).

Delayed wound healing. The factors that delay wound healing are multiple and relate both to diabetes and to the effect of its complications. Diabetics suffered more often from superficial sternal wound infection and had a higher incidence of superficial wound infections at the vein harvest site (9) The metabolic goals in therapy are: fasting blood glucose consistently between 65-140 mg/dl before and after surgery and 120-180 mg/dl at the time of surgery; and postprandial blood glucose consistently <180 mg/dl. These goals were achieved in 18.1% of fasting blood glucose measurements before and after surgery, 22.1% of preprandial and 14.6% of postprandial blood glucose levels consistently <180 mg/dl. (10).

New approaches to the acute rehabilitation:

The aim of acute cardiological rehabilitation:

1. Reduce morbidity and mortality

2. Improve functional capacity these include hemodynamic and cardiac changes, alterations in neurohumoral responses, and peripheral changes in skeletal muscle and oxygen delivery

3. Return to work.

4. Risk factor modification such as nutritional counseling, smoking cessation, psychosocial interventions, patient compliance (11).

In acute cardiological rehabilitation there are different programs for different patients:

1. Percutaneous Transluminal Coronary Angioplasty (PTCA): PTCA are effective for interrupting the process of acute coronary stenosis. Although it is fortunate that myocardial tissue damage can be avoided or minimized if the patient is treated in a timely manner, the

need to treat the underlying disease that precipitated the stenosis is not changed after a revascularization procedure. Despite the expanded use of percutaneous revascularization, there are few controlled studies of cardiac rehabilitation after these procedures. In one study, 93 patients who had been treated with percutaneous transluminal coronary angioplasty were randomly assigned to receive a behaviorally oriented intervention or a control group. Subjects in the intervention group participated in a comprehensive behaviorally oriented program aimed at achieving significant long-term changes in risk factor-related lifestyle behavior. Assessments of lifestyle behaviors, psychological factors, biological risk factors, and rehabilitation as well as secondary prevention endpoints were carried out, at inclusion and after 12 months. Results showed that the intervention patients, as compared with controls, improved significantly on measures assessing smoking, exercise, and diet habits. Although the mechanisms for decreased mortality with exercise have not been fully explained, exercise training improves the lipid profile, reduces BP, lowers the fasting glucose level, and reduces body fat and increases lean body mass (12,13,14)

2. Heart transplantation: Heart transplant patients experience persistent heart failure, diminished aerobic capacity, muscle atrophy, side effects of immunosuppressive medications (muscle and bone loss, and fat gain), infections, rejection, and premature coronary atherosclerosis. There were significant reductions in submaximal values for minute ventilation, ratings of perceived exertion, and diastolic blood pressure at equivalent workloads. Heart rate, BP, and cardiac output responses also are impaired (12,15,16)

3. By pass operation: A high frequency exercise program leads to earlier performance of functional milestones and yields more satisfaction after uncomplicated CABG surgery and this should lead to an earlier discharge. Exercise training improves the lipid profile, reduces BP, lowers the fasting glucose level and reduces body fat and increases lean body mass (17).

4. Heart valve surgery: Heart valve surgery patients have no unique characteristics that differentiate them from patients with myocardial infarction, patients who have undergone coronary artery bypass surgery or patients who have angina in terms of the need for cardiac rehabilitation. Before aortic or mitral valve replacement or repair, many patients are classified as being in NYHA class III to IV, with a functional capacity of three to four metabolic equivalents or less. Cardiac hemodynamics and symptomatology with valve disease are similar to those of heart failure. Physical training shortly after valve operation rapidly and persistently improves physical work capacity. But also many patients continue to exhibit abnormal rest-to-exercise changes in LV ejection fraction (8,18,19)

5. Pacemaker or ICD implantation: It is important to find out the pacemaker`s reaction to the exercise thearpy. Pacemaker's heart rate should be set according to the formula of 220 minus the wearer's age. After implantation of a ventricular demand pacemaker (VVI), occasional patients continue to have dizziness, syncope, or near syncope "pacemaker syndrome" (20)

6. Choronic congestive heart failure: Exercise training improved exercise tolerance, as measured by increases in peak VO2, exercise duration, and power output. This improved exercise tolerance was caused in part by an increase in peak heart rate. The aetiology of heart failure, despite a different baseline sympathovagal balance, does not influence the favourable clinical and autonomic modulation induced by rehabilitation. Independently from the underlying disease, all clinically stable patients with heart failure can benefit from rehabilitation (21)

Cardiac rehabilitation programs are safe and effective in improving the functional activities of patients with cardiac disease, but they may be hazardous to those patients whose life might be in jeopardy if subjected to exercise. It is clear that not all cardiac patients require supervised rehabilitation programs to return to normal pre-cardiac-event activities. Many patients who have suffered cardiac events recover from the events without much functional debilitation, usually because they were normally active prior to the cardiac event. Patients who have had heart transplants, percutaneous transluminal coronary angioplasty, or heart valve surgery have no unique characteristics that differentiate them from cardiac patients who have had a myocardial infarction or coronary artery bypass graft or who have stable angina in terms of the necessity for participating in supervised rehabilitation programs. Therefore, patients who have had these surgical procedures might be selected for enrollment in cardiac rehabilitation programs on the basis of their physical and psychological conditions. Those patients who benefit from rehabilitation programs usually accomplish their goals within the 12-week sessions of the usual programs.

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L062

PROFESSIONALISM IN MEDICINE

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There exists a widespread concern on loss of respect and trust in the medical profession. The path to remedy is through ensuring that physicians are worth the respect and trust they desire. This could be accomplished by the elements of professionalism. Global societal changes and transformation of medicine itself has raised doubt concerning the value and validity of medical professionalism. Rightly medical associations have chosen to take action for protection and enhancement of professionalism in medicine.

Professionalism is the possession of skills, attitudes and behaviors, which are expected from individuals during the practice of their profession. *Maintenance of competence, ethical behavior, integrity, honesty, altruism, service to others, adherence to professional codes, justice, respect for others, self-regulation* are the fundamentals of professionalism[i].

Two main qualifications make up a profession: possession of a specialized body of knowledge and skills known only by its practitioners, and a commitment to serve for others. Abandoning of self-interest distinguishes a true profession. This feature is of great importance in medicine to convince the public that physicians can be trusted to use their skills for the good of the patient.

Professionalism requires a moral commitment to the ethic of medical service, in other words it calls for devotion to medical service and its values. American Board of Internal Medicine has enumerated the following elements of professionalism required for certification and recertification of its members: *altruism*, accountability, *excellence*, *duty*, *honor and integrity*, *respect for others*.

Common challenges to professionalism may be grouped as external and internal. The major external challenges are *commercialism, consumerism, bureucratization* and *industrialization*. The profession cannot easily control some of these, and must derive a strategy to convince the decision-makers to adopt more convenient policies to conserve professionalism. Physicians with their associations have to revise relations with the industry and business organizations to defend the profession against the challenge of commercialism.

Internal challenges are due to failures to uphold the *ethic of service*, *clinical autonomy* and *self-regulation*. Physicians have to keep the interests of their patients above their own, but not to the extent of negligence of themselves or their family members. Appropriate balance between service to patients and the legitimate personal or family interests is essential. Reports of physicians sexually abusing patients, receiving gifts from pharmaceutical companies or participating in job actions have undermined the society's trust in the professionals.

Boundaries of clinical autonomy is another challenge to face. Self-regulation within the profession must protect its members but without disrespecting the rights of patients. Physician impairment and unprofessional behavior such as abuse of power, greed, misrepresentation, professional arrogance, lack of conscientiousness, must be defined and prevented.

Dealing with the above challenges requires hard work to be done in three areas: policy, education and self-regulation. Medical associations must assume the principle role in defending the profession against decaying. An essential part of this role is setting up policies. Frequent reevaluations of issues such as autonomy and self-regulation are necessary. Established professional values and policies must be transmitted to current and future members of the profession through medical education. The difficulty of evaluating professionalism is an important challenge against implementing it in the medical curriculum. American Board of Medicine has developed and proposed tools for evaluating professionalism and also suggestions as remedies for deficiencies. Association of American Medical Colleges and National Board of Medical Examiners sponsored conference produced a valuable report on assessment and implementation of professionalism in undergraduate education[ii]. The values of professionalism can be taught formally and informally[iii]. Pertinent to this, the structure of the academic health center where education takes place should be kept less commercial and more service oriented. Regrettably an increasing percentage of health care is now organized for profit. During educational experience students move from taking notes and focusing on the explicit curriculum to learning most from what the tutors do. Therefore, if change is expected from the student, tutors have to change themselves.

Where self-regulation of the profession is inadequate, governments or other bodies take over. Medical associations have to convince its members and also the public that the benefits of self-regulation are for all. High standards of behavior must be set and enforced.

National medical associations can participate in and support international initiatives on medical professionalism. Activities of the World Medical Association, development of a Physician Charter on Medical Professionalism by the European Federation of Internal Medicine, the American Board of Internal Medicine, American College of Physicians/American Society of Internal Medicine, and Canadian Medical Association are some examples[iv].

L063

DISABILITY AND HUMAN RIGHTS

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Frequently Asked Questions (FAQs)

What is the definition of disability?
What is the mandate for the UN Programme on Disability?
What has the UN done for persons with disability?
What is being done on a convention to promote and protect the rights and dignity of persons with disabilities?
Does the UN monitor the situation of disabled persons in different countries?
What does the Special Rapporteur on disability do?
Does the UN provide funding to organizations for persons with disabilities in their activities?
Where can I find UN documents related to disability?

What is the definition of disability?

There is no universally agreed definition of disability. The World Programme of Action for Disabled Persons and the Standard Rules on the Equalization of Opportunities for Persons

with Disabilities emphasizes that disability is a socially created problem and not an attribute of an individual. Disablement results from a dynamic interaction between health conditions and other personal factors (such as age, sex, personality or level of education) on the one hand, and social and physical environmental factor on the other hand. It, therefore, is important to distinguish between *Impairment*: Any loss or abnormality of psychological, physiological, or anatomical structure or function; *Disability*: Any restriction or lack {resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being and; *Handicap*: A disadvantage for a given individual, resulting from an impairment or disability, that, limits or prevents the fulfilment of a role that is normal, depending on age, sex, social and cultural factors, for that individual. This social perspective on disability is reflected in the International Classification of Functioning, Disability and Health (ICF), adopted by the World Health Assembly in 2001. The ICF further recognizes that disability is a universal human experience and not a concern to a minority of humanity: every human being can suffer from a decrement in health and, thereby, experience some disability.

What is the mandate for the UN Programme on Disability?

The UN Programme on Disability is the lead programme on disability within the United Nations System. It is housed in the Division for Social Policy and Development at the Department of Economic and Social Affairs of the UN Secretariat.

The mandate of the Programme stems from the World Programme of Action concerning Disabled Persons adopted by the United Nations in 1982 and the Standard Rules on Equalization of Opportunities for Persons with Disabilities adopted in 1994. The major objectives of the Programme are the following: (i) to support the full and effective participation of persons with disabilities in social life and development; (ii) to advance the rights and protect the dignity of persons with disabilities and; (iii) to promote equal access to employment, education, information, goods and services.

The UN Programme on Disability also serves as substantive secretariat for the General Assembly Ad Hoc Committee on a comprehensive and integral international convention to promote and protect the rights and dignity of persons with disabilities.

What has the UN done for persons with disability?

During its first three decades, the United Nations moved from a welfare perspective on disability to a development and human rights perspective. This approach was promoted during the International Year of Disabled Persons in 1981 and embodied in the World Programme of Action concerning Disabled Persons adopted in 1982. This approach was further development during the United Nations Decade of Disabled Persons (1983-1992) and led the adoption of the Standard Rules on the Equalization of Opportunities for Persons with Disabilities in 1994. It is widely agreed that, since its adoption, the application of the principles expressed in the Standard Rules has greatly contributed to the diffusion of best practices on equalization of opportunities for persons with disabilities

In June of 2003, the General Assembly decided to engage in the drafting of "a comprehensive and integral international convention to promote and protect the rights and dignity of persons with disabilities".

In 1992, the United Nations proclaimed 3 December of each year as International Day of Disabled Persons with the aim of promoting a better understanding about disability issues and increasing awareness of gains to be derived from the integration of disabled persons in every aspect of political, social economic and cultural life.

What is being done on a convention to promote and protect the rights and dignity of persons with disabilities?

The rights of persons with disabilities are grounded in a broad human rights framework based on the United Nations Charter, the Universal Declaration of Human Rights, and other human rights instruments. However, the need for a specific convention for persons with disabilities has been increasingly recognized, and in 2001, the General Assembly established an Ad Hoc Committee to consider proposals for a comprehensive and integral international convention to promote and protect the rights and dignity of persons with disabilities, based on the holistic approach in the work done in the fields of social development, human rights and non-discrimination. Eventually, the General Assembly decided to engage in the drafting of such convention is June of 2003.

Does the UN monitor the situation of disabled persons in different countries?

Among the major outcomes of the Decade of Disabled Persons was the adoption, by the General Assembly, of the Standard Rules on the Equalization of Opportunities for Persons with Disabilities in 1994. The Standard Rules consists of 22 rules summarizing the message of the World Programme of Action, and serves as an instrument for policy-making and as a basis for technical and economic cooperation. The Rules also provides for a monitoring mechanism: the Special Rapporteur on Disability, who reports on the implementation of the Standard Rules to the Commission for Social Development of the Economic and Social Council. The Special Rapporteur establishes a direct dialogue with Member States and also with local non-governmental organizations and experts, seeking their views and comments on any information intended to be included in the reports.

What does the Special Rapporteur on disability do?

The United Nations Standard Rules for the Equalization of Opportunities of Persons with Disabilities provides for the appointment of a Special Rapporteur to monitor the implementation of the Rules. The Special Rapporteur reports yearly to the Commission for Social Development. The reports present findings on the promotion and monitoring of the implementation of the Standard Rules and present recommendations, as requested by the Commission, on their further development. In carrying out his/her functions, the Special Rapporteur establishes a direct dialogue with Member States and with local non-governmental organizations and experts, seeking their views and comments on any information intended to be included in the reports.

Does the UN provide funding to organizations for persons with disabilities in their activities?

The United Nations provides support to organizations for persons with disabilities in their activities through the UN Voluntary Fund on Disability. Funding priority is targeted to building the capacity of non-governmental organizations to take part in the making of the Convention and its future implementation. The Fund also provide small grants to support catalytic and innovative action, which will promote greater awareness of disability issues and exchanges of knowledge and experience and promote wide dissemination of appropriate disability technologies.

L064

CANCER REHABILITATION

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Cancer has become a common condition and continues to be a source of significant disability. More than 1 million people are diagnosed with cancer each year and the prevelance is more than 8 million people in the United States (1). With the exception of stomach and cervical tumors, the incidence rates for all of the major cancers have been increasing over the past four decades (2). The medical statistics about the cancer registry of the Ministry of Health in Turkey show that the incidence of cancer has almost increased

four times in the last 20 years. The most frequent cancer is the lung cancer followed by breast cancer (3).

Over the past two decades, cancer rehabilitation has received little attention in either clinical and basic science arenas. But with the extended survivorship due to enhanced multimodal therapies attention is being increasingly directed to quality-of-life issues for patients either cured or struggling with advanced cancer (4).

Contemporary cancer rehabilitation is a concept that is defined by the patient and involves helping a person with cancer to obtain maximum physical, social, psychologic, and vocational functioning within the limits imposed by the disease and its treatment (5). The ultimate goal of cancer rehabilitation is to enhance the quality of life of the cancer patient. The options for delivering rehabilitation services include inpatient rehabilitation, outpatient rehabilitation, and consultation services during acute care (6). The physiatrist and the rehabilitation team are in a strong position to provide strategies and offer practical suggestions that will both improve the functional status and overall quality of life of individuals with cancer. Thereby cancer patients will also be offered some degree of hopefulness throughout the course of their illness. Strong doctor-patient relationship are forged and close communication with other physicians and care providers is essential.

Who is a candidate for rehabilitation?

Individuals with cancer are living longer now than before. The 5-year survival rates for most tumors continue to improve due to earlier detection and treatment strategies. The 5-year survival rate for many cancer sites exceeds 50%. This is esspecialy true for breast, larynx, prostate, and kidney tumors. On the other hand, tumors of stomach, esophagus, hepatic, pancreas, lung, nervous system, and leukemias/myeloma have lower 5-year survival rates (7). For many patients with early stage cancer, normal life expectancy is anticipated. Although they will be free of cancer for years to come, there can be sequelae from cancer treatments that impair functioning. Others live with active cancer for many years, with symptomatic problems controlled by surgery, hormones, chemotherapy or radiation therapy and for these individuals cancer is a truly chronic disease. For those individuals with advanced disease at the time of diagnosis, pain and functional impairment are common presenting problems that are direct results of the disease. Therefore, attention to the functional problems of cancer patients is relevant at any point in the diagnostic and therapeutic continuum (e.g., from diagnosis to treatment planning, treatment, post-treatment, recurrence, and end of life) and rehabilitation interventions are appropriate for all of these individuals who are living with cancer.

The importance of rehabilitation needs in patients with cancer has recently received increasing recognition. However, since the first major description of rehabilitation needs in patients with cancer, published more than 20 years ago, few studies have addressed these patients from rehabilitation perspective. The need for cancer rehabilitation was first documented in 1978 by Lehman et al, who studied 805 patients at cancer referral centers (8). 438 of the 805 patients (prevelance was more than 70% in breast cancer, lung cancer, and head and neck tumors) had physical medicine and rehabilitation problems and these problems occurred with all tumor types. In this study, 52% of the cancer patients had psychologic problems, 35% had general weakness, 30% had ADL problems, 25% had difficulties with ambulation, 7% had deficits in transfers, and 7% had deficits in communication. Ganz et al surveyed 500 patients with colorectal, lung, and prostate cancer who had been living with cancer for over a year and found more than 80% reported gait problems, with 50% indicating that these problems were severe (9). Significant problems in ADL and vocational pursuits were also reported. In 1997, a cross-sectional study revealed that both ADL and instrumental ADL were significantly limited in cancer patients (10). In this study, 1647 of 9745 surveyed elderly indicated that they had a nondermatologic malignancy. Of these, 47% reported difficulty with ADLs, 38% had difficulty walking, 20% had difficulty bathing, and 21% had difficulty with transfers. Forty-nine percent had difficulty with instrumental ADLs such as heavy and light housework, shopping, and meal preparation. A recent study in 2003 showed that patients admitted to inpatient medical oncology units have many unmet, remediable rehabilitation needs that may not be recognized by nonrehabilitation physicians and clinical staff (11). In this study, rehabilitation needs assessment on admission showed deconditioning in 76%, mobility impairment in 58%, need for increased ROM in 42%, deficits in ADLs in 22% of the patients. Additionally, 13% of the patients needed recreational therapy.

There are various problems of cancer patients that rehabilitation approaches are needed. These include confusion and lack of information about the process, anxiety, fatigue and weakness, pain, mobility and self-care problems, lymphedema, myofascial pain, cognitive and communication deficits, bony metastatic disease, bony instability, brain metastasis, spinal cord metastasis, paraneoplastic neuromuscular syndromes, peripheral neuropathy, acute and late adverse effects of radiation therapy, adverse effects of chemotherapy, nutrition, dysphagia and speech deficits, sensory loss, wound and healing, bowell and bladder, sexual function, complications of disuse and bed rest, and deconditioning (1,7,12)

What are stages and the principles of cancer rehabilitation ?

The rehabilitation goals of cancer patients are similar to those of patients with impairments caused by other diseases. They include obtaining independent mobility and independence in basic ADL, with or without assistive devices. Rehabilitation goals can be further defined according to when they are applied in the different stages of the disease (2). ***Preventive rehabilitation therapy,*** the goal is to achieve maximal function in patients considered to be cured or in remission; ***supportive and restorative rehabilitation therapy***, this is for patients whose cancer is progressing and the goals include providing adaptive self-care equipment, range of motion exercises and bed mobility techniques and all other preventive measures for the adverse consequences of immobility; ***palliative rehabilitation therapy*** goals are to improve or maintain comfort and function during the terminal stages of the disease. The application of orthoses, modalities, and assistive equipment can be useful as an adjunct to pharmacological pain management. There might occasionally be a need to change the rehabilitations interventions as the patients goes through the different stages of the disease.

What is the outcome of cancer rehabilitation ?

The literature that dose exist, while in small quantity, does demonstrate both a pressing need for cancer rehabilitation and the valuable contribution it can make to patients' functional status and quality of life. In 1991 O'Toole and Golden reported on 70 cancer patients admitted to a free standing rehabilitation hospital (13). They reported that 14% of their patients could ambulate indepedently on admission, while at discharge 80% were independent or needed supervision with ambulation. Bladder continence rose from 38% at admission to 87% at discharge. Patients were reevaluated 90 days postdischarge. Nineteen patients had died and 14 were lost to follow-up; but of the remaining 37, 20 had maintained or improved their functional level. Yoshioka reported on a prospective 6- year study involving 301 terminal cancer patients in an inpatient hospice in Japan (14). The interventions was bedside or gym physical therapy consisting of appropriate positioning, range of motion, therapeutic exercise, bathing, bed mobility, transfers, modalities, swallowing training, and pneumatic compression. Of the 239 patients with ADL disturbances, the average transfer and locomotion score on the Barthel mobility index (maximum score=47) significantly increased from 12.4 to 19.9, for a mean increase of 7.5. Bedside or gym physical therapy worked best when there was good pain control, strong patient motivation and desire for improvement, and the ability to exercise or participate in physical therapy. Forty-six patients were able to go home for varying time periods because of improved ADL. Three months

after patients' death, a satisfaction survey was sent to the families. Of the 169 responders, 98% were satisfied with hospice care, 78% were satisfied with the rehabilitation and 63% found rehabilitation program to be effective. Marciniak et al showed that patients with various cancers undergoing inpatient rehabilitation at a freestanding university-affiliated rehabilitation hospital achieved significant functional gains across various diagnostic categories (15). More than half of the patients in this study had primary intracranial tumors. The presence of metastatic disease did not influence functional outcome, and patients who received radiation made the greatest functional improvement compared with those who did not receive radiation or had not completed radiation before rehabilitation. Mc Kinley et al investigated individuals with spinal cord tumors admitted to a spinal cord injury rehabilitation unit at a tertiary university medical center and found that these patients also achieved significant functional gains and maintained these gains up to three months after discharge (16). In a prospective study conducted at Mayo Clinic significant functional gains were observed in hospitalized cancer patients who received interdisciplinary rehabilitation services (Cancer Adaptation Team) services on a consultation basis (17). Puliyodil et al demonstrated the beneficial effect of comprehensive rehabilitation on functional outcome in children with residuel disabilities after treatment of their primary brain tumors (18). Sliwa reported a case with paraneoplastic subacute cerebellar degeneration who experienced improvements in all functional activites after comprehensive inpatient rehabilitation and this case was suggested as a a testimony to the value of rehabilitation in paraneoplastic syndrome (19). Additionally, the efficacy of postacute brain injury rehabilitation for patients with primary malignant tumors was shown before (20). In a study of hospice patients, Wallston et al reported that 22% of the patients with terminal cancer wished to be physically able to do as they chose even in the last three days of life (21). Answers to questionnaires showed that more than half of patients with terminal cancer complained about problems in performing ADLs and that about 88% of patients had a strong desire for mobility. A recent study by Scialla et al retrospectively examined the medical records of 110 weak, elderly inpatients with cancer asthenia at an acute care rehabilitation hospital who were transitioning from curative treatment toward palliative care (22). Their data suggested that physical and cognitive functioning may improve after comprehensive inpatient rehabilitation.

Cancer is the second-leading cause of death in many countries and life time risk for an individual varies between 38% and 47% (23). These statistics shows the dramatically expanding future need for comprehensive cancer rehabilitation programs. Depending on the above studies,we state that almost all individuals with cancer can benefit from rehabilitation evaluation and rehabilitation interventions. But we have have to convince oncologists and oncologic surgeons of the potential role of rehabilitation services. Additionally, we must educate our professional community to understand the role that rehabilitation should play in planning treatment for the cancer patient and objectively demonstrate the efficacy of rehabilitative interventions in our population.

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L065

CENTRAL SENSITIVITY SYNDROMES: FIBROMYALGIA, MYOFACIAL PAIN AND CHRONIC FATIGUE SYNDROME

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Fibromyalgia, myofascial pain and chronic fatigue syndromes constıtute dignostic labels for non-specific musculoskeletal aches and pains. Analysis of the evidences shows that none of these labels is substantiated by hard physical signs or by laboratory evidence of consistent pathological or biochemichal abnormality. Despite different diagnostic criteria, these conditions, along with chronic fatigue sydrome, have many demographic and clinical similarities, most notably tender trigger points. There are few differences in the symptoms, physical findings, laboratory tests, functional status,

psychosocial features and psychiatric disorders. The only claimed physical sign is the presence of tender/trigger points over the muscles or their attachments. Research suggests that these points are a measure of general distress related to pain complaints but separately associated with fatigue and depression.

Fibromyalgia represents a disorder of generalised heightened pain sensitivity. Primary or secondary alterations in substances such as serotonin, endorphins and substance P may integrate the changes in sleep, pain and mood. Substance P release is influenced by serotonin and serotonin deficiency, in either the peripheral or central nervous system, could cause an exaggerated perception of normal sensory stimuli. Central sensitivity syndromes present reduced pain tolerance to pressure, heat and electrical pulse, both at classic tender points.

Myofascial pain syndrome may be one of the most common causes of pain and is often not recognised in clinical practice. The pathogenesis is not known, although mechanical nociceptive and primary muscle pathology have been postulated. These potential pathophysiologic factors are similar to those described below in fibromyalgia. Futhermore similar psychologic and sleep abnormalities have been reported in myofascial pain and fibromyalgia syndromes.

A significant clinical overlap between chronic fatigue and fibromyalgia syndrome was reported. Cytokine dysregulation was not found to be a singular or dominant factor in the pathogenesis of chronic fatigue. Much interest has been expressed in the literature on the possible role of autonomic dysfunction in the development or exacerbation of fatigue and other symptoms in CFS.

No major therapeutic trials in fibromyalgia, chronic fatigue syndrome or myofascial pain syndrome over the past year. Cognitive behavioral therapy is of importance since the common pathogenesis of these syndromes results from central mechanisms rather than peripheric stimulation.

L066

NEW TREATMENT STRATEGIES IN FIBROMYALGIA

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Fibromyalgia Syndrome (FM) is a common, chronically painful, frequently disabling disorder of unknown origin. There is no permanent cure for fibromyalgia; therefore, adequate symptom control should be goal of treatment. Clinicians can choose from a variety of pharmacologic and nonpharmacologic modalities. Unfortunately, controlled studies of most current treatments have failed to demonstrate sustained, clinically significant responses [1]. Bennett [2] rightly observed that this realization can overlook valid clinical successes and foster therapeutic nihilism.

Why do FM patients respond differently to different treatments? It seems to depend on the different pathogenetic mechanisms in the subgroups of FM patients. Principally at least four different phenomena play a role within this: disturbances in the inhibitory system [3]; neuro-endocrine disturbances [4-7]; disturbances in neuropeptides [8]; and a pathologic decreased secretion of the growth hormone [9]. Furthermore, recent findings suggest that cytokines [10-13], biogenic amines [15], nitric oxide [15], microcirculatory changes [16] and prostaglandins [17] may contribute to FM pain [18].

No pharmaceutical therapies have been successful in treating FM over the long term. Most patients have numerous symptoms in addition to pain, including sleep disturbance, fatigue, irritable bowel and psychologic distress. Because all of these symptoms are unresponsive to conventional pharmacologic treatments, patients with FM often present their treating physicians a list of vitamin, minerals, supplements, and prescribed therapies [19].

A wide variety of interventions are used in the management of FM [20]. There is, however, no clear consensus on the treatment of choice, and FM remains relatively refractory to treatment. Therefore, prevention, causal therapy, and rehabilitation are not possible. Currently, therapy is polypragmatic and is aimed at reducing the pain and other symptoms associated with this condition. Therapy consists of drug treatment, physical exercises, psychological interventions, and other symptomatically oriented therapies, such as acupuncture and laser [21-23]. Effective interventions that last for more than a year have not yet been shown. Research is increasing exponentially in this field, to help us better understand the reasons why this disease develops [18].

Considering current knowledge there are virtually no specific treatments which are based on pathophysiological mechanisms underlying fibromyalgia. However, there is an array of treatment strategies in targeting disease consequences. While medication mainly focuses on pain reduction, physical therapy is aimed at pain, fatigue, deconditioning, muscle weakness and sleep disturbances and other disease consequences [24]. Rehabilitation plays a crucial role in the treatment of FM, particularly among patients more severely disabled by their chronic painful condition [18].

Patients seek alternatives to prescribed medications that are ineffective or have unpleasant side-effects. Alternative therapies are generally perceived to be more “natural” and, as a result, to have fewer adverse effects. In addition, complementary approaches address symptoms that are often ignored by conventional therapeutic regimens, including fatigue and cognitive dysfunction. The percentage of patients with rheumatologic disorders using alternative therapies ranges from 33% to 100%, with 91% of patients with FM using complementary and alternative medicine over a 12-month period [25].

Depression is common in patients with fibromyalgia and if present needs to be treated independently from other strategies to manage the FM. In the absence of depression the most commonly used anti-depressant drugs to treat FM are the tricyclic drugs and of these amitriptyline has been the most studied. At best these drugs are only moderately effective over the short term and have not been studied for longer than three months. It is estimated that about a third of FM patients respond to these agents. Using current clinical methodology, highly selective serotonin reuptake inhibitors such as fluoxetine and citalopram have shown variable but generally only modest effects on the different components of FM. Less selective agents, such as venlafaxine, have also faired poorly in clinical trials. Agents that more equally suppress norepinephrine and serotonin, the so-called dual re-uptake inhibitors, are showing more promise, particularly duloxetine and milnacipran [26].

It is important to note that clinical trial methodology has improved over the total time period that the above agents have been assessed and FM outcome measures, in particular, are now better defined. Response using these newer agents appears better. Of interest, the newer agents are showing effects both on the pain and related symptoms of FM and also on change in pain threshold. Thus both the symptoms of FM and the signs of FM are improved. This possibly implies a more fundamental effect on FM causative mechanisms.

Which anti-depressant for fibromyalgia? These newer anti-depressant agents do show considerable promise in providing improved outcomes for fibromyalgia patients. Through observations of their effects on components of FM they may also help unravel basic pathophysiological processes contributing to this enigmatic disorder [27].

Fibromyalgia remains a syndrome that is difficult to understand and treat successfully. FM patients frequently use alternative therapies, indicating dissatisfaction, or ineffectiveness of traditional medical therapy. The demonstration of a long-term effective intervention for managing the symptoms associated with FM is needed. Despite the

positive results found, the number of publications related to the application of physical therapy modalities such as acupuncture, TENS, laser, biofeedback, electrotherapy and magnetic field is still scant, especially concerning FM treatment. Multidisciplinary approaches to management include physical and medical therapeutic strategies. Treatment modalities should be individualized for patients based on target symptoms and impairment in functioning. Patience and positive attitude on part of the physician and active involvement of patients and their families in treatment are likely to enhance improvement [28]

Complementary or alternative medical (CAM) therapies have gained increasing popularity, particularly among individuals with FM for which traditional medicine has generally been ineffective. Some herbal and nutritional supplements (magnesium, S-adenosylmethionine) and massage therapy have the best evidence for effectiveness with FM. Other CAM therapies such as chlorella, biofeedback, relaxation have either been evaluated in only one randomized controlled trials (RCT) with positive results, in multiple RCTs with mixed results (magnet therapies), or have positive results from studies with methodological flaws (homeopathy, botanical oils, balneotherapy, anthocyanidins, dietary modifications). Another CAM therapy such as chiropractic care has neither well-designed studies nor positive results and is not currently recommended for FM treatment. Once CAM therapies have been better evaluated for safety and long-term efficacy in randomized, placebo-controlled trials, they may prove to be beneficial in treatments for FM. It would then be important to assess studies assessing cost-benefit analyses comparing conventional therapies and CAM [29].

The treatment of symptoms associated with FM can be approached by manipulating 6 different pathways, only a few of which have been adequately investigated [30]. First, agents which influence chemicals in the ascending pain tracts are just beginning to be looked at. These include NMDA antagonists (e.g., ketamine, tramadol), nerve growth factor blockers, substance P blockers, and ion channel modulators of sodium, calcium, or magnesium. Second, agents which influence chemicals in the descending pain tracts make up most of the studies published so far. These encompass opiates, serotonin boosters, dopamine or norepinephrine antagonists, and gamma amino butyric acid (GABA) modulators. Antiinflammatory approaches such as nonsteroidals have a limited role in fibromyalgia, as do topical or local regimens which block limited or regional pain. Agents which modulate muscle metabolism include muscle relaxers and a variety of substances which influence blood flow to muscle or ATP. Finally, chemicals that influence cerebral function subject to modification include hormones, autonomic nervous system components and cytokines. In all probability, the management of fibromyalgia will include a combination of these interventions in addition to physical measures such as exercise and emotional support [31].

If FM is identified and appropriately managed early (within 2 years), there is a high degree of reversibility in that more than half of these individuals no longer meet the ACR criteria for FM at 24 months. Patients aggressively treated at tertiary centers with more than 5 years of symptoms almost always still fulfill the ACR criteria two years later [32-36].

Based on the above studies, there are several promising avenues for investigation relating to cytokine based therapies in FM. Cytokines can be delivered parenterally, but there are none which have a strong pathogenetic rationale which can be suggested at this time. The development of inhibitors to cytokines can take several forms. For example, anti-TNF therapies consist of antibodies (both chimeric and humanized) and soluble molecules which block cell signaling. This can be accomplished with binding proteins (via a decoy), blocking receptors or fusion proteins.

The most promising approaches appear to lie with inhibiting the actions of IL-1, IL-6 or IL-8. Kineret (Anakinra) is an IL-1 receptor antagonist with modest anti-inflammatory actions. In its RA clinical trials, no alterations in cognition or neurologic symptoms were observed and it is probable that this preparation does not cross the blood brain barrier. The blood brain barrier represents a physical barrier to cytokine-central nervous system interaction. Quan and Herkenham recently reviewed five pathways by which cytokine signals can be relayed across the blood brain barrier: 1) active transport, 2) vagal nerve activation, 3) through a leak at the circumventricular gyrus, 4) by inducing production among blood brain barrier cells, and 5) by being carried across the blood brain barrier by infiltrating lymphocytes [37]. Anti IL-6 is being developed for rheumatoid arthritis and has been looked at in Phase I/II trials [38]. It is possible that blocking IL-8 might treat reflex sympathetic dystrophy or the dysautonomic actions associated with FM. This is an exciting time in pain investigation and it is highly probable that the manipulations of cytokines will play an important role in the future management of fibromyalgia [31].

A number of FM treatment reviews that focus on components of the multidisciplinary approach have been published in recent years. These include physical therapy and exercise interventions [39-41], pain management [42,43], cognitive-behavioral strategies [44], coping skills training [45], educational programs [46], mind-body therapies [47], complementary and alternative medicine techniques [48,49), and drug treatment [50,51]. These reviews, along with three evaluations of multidisciplinary rehabilitation [52-54], one review of non-pharmacological treatments [55] and two general reviews of treatment that included drug studies [56,57], all suggest, with varying levels of confidence and caution, that a number of treatments are effective for decreasing FM symptoms.

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L067

SPINAL INJECTIONS **PAST, PRESENT, AND FUTURE**

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Disorders of the spine and its surroundings are an important topic which incorporates many medical disciplines. Unfortunately, while this critical subject is cared by the perspectives of various disciplines, every discipline tends to deal with the subject from its perspective and vision, resulting in many distinct treatment modalities. As a consequence, the lack of multidisciplinarity leads to the lack of a well defined treatment program and unsatisfactory outcome, especially for the patients.

Our knowledge about the spinal anatomy has increased widely in the past two decades. The spine is amongst the regions exposed to surgery

most frequently, both in the past and in today's medical practice. Each medical discipline continues to give different outcomes in different stages of the disease, according to their perspectives. Today, defining the correct paradigms are much more mandatory than that in the past for a correct approach for the spinal diseases.

Past

Prior to 1980s, the spinal care was mostly myelogram dependent. If the patient had spinal pain and a defect in myelogram, he or she was accepted to be a candidate for surgery. Non-surgical treatment modalities were believed to be ineffective and despised in patients with a myelogram defect. Today, although imaging techniques like computed tomography (CT) and magnetic resonance imaging (MRI) have replaced myelography, the same paradigm, i.e. the treatment of a structural defect is surgery concept, continues to dominate. In the past, the non-surgical treatment options of such a patient were strict bed rest for a long period or application of traction. In the beginning, there was even a period that mobilization or physical rehabilitation were believed to be ineffective.

In the case of surgical failure, it was assumed that the responsibility belonged to the patient and his or her psychological imbalance; "the surgical intervention worked perfectly but the patient's psychological factors hindered the pain relief".

The mechanical back pain was being related solely to neural compression by a prolapsed disc or hypertrophic changes. This compression was assumed to be the only reason, either it was present in the myelogram or not.

Axial pain was another problematic entity. It was thought to be the result of segmental instability. The surgical disciplines extremely believed in the presence of this instability and developed spinal arthrodesis techniques. Many patients underwent radical discectomies and radical facetectomies to 'treat the neural compression'. Plenty of fusion operations were performed. The failure of internal fixation and fusion operations increased at once and the number of failed back surgery patients rose steeply. In this era, epidural steroid injections without any imaging technique guidance gained popularity. The recently established pain clinics applied epidural steroid injections after or even before the surgery without well defined indications.

The development of imaging techniques

We may say that the development of imaging techniques has a revolutionary role in the assessment of back pain. It became possible to evaluate the lateral recess for the first time with the aid of CT. It was discovered that the reason for many of the surgical failures was lack of adequate evaluation of lateral canal stenosis. It became possible to evaluate facet joints and discal pathologies clearly with CT, which was impossible during the myelogram period. With the aid of MRI, discal pathologies started to be classified more accurately and internal structure of the disc was visualized. The development of imaging techniques to demonstrate spinal pathologies has led to new opportunities in the diagnosis and treatment. Injection techniques have begun to develop. Transforaminal injections with fluoroscopic guidance have started to be applied targeting the affected nerve root and lateral recess. By the use of fluoroscopy, it became easier to reach the facet joints. As a result of anatomical studies, rhizolysis techniques of the medial branch of dorsal ramus, which innervated the facet joints, have been developed. Neuroanatomical studies revealed that the morphological changes were not the sole reason for spinal pain. The neurophysiological aspects of pain have begun to be discovered. The discovery of high inflammatory mediator concentrations inside the disc, and presence of substance P in dorsal root ganglions and disc, revealed the fact that surgery was not the only treatment approach for the discal diseases and it was necessary to discover alternative methods.

Under the light of these neuroanatomical developments, a new paradigm has begun to develop besides the morphological-structural paradigms. In this new paradigm, that aimed to preserve the functionality of the disc, the first goal is to accurately diagnose the origin of pain with the aid of imaging techniques and spinal injections, and then prepare the patient for functional rehabilitation with minimal invasive applications.

Summary of the past:

It has been discovered that;

a. spinal pain does not only arise from the structural disorders, thus surgically treating the structural abnormality may be inadequate for the satisfactory outcome,

b. It is crucial to reevaluate the region under the light of neuroanatomical and biochemical advancements,

c. Minimally invasive interventions guided with imaging techniques should be paid more attention.

Present

According to this reasonable treatment algorithm, the injection of anti-inflammatory agents like corticosteroids, hyalurinidase is followed by physical rehabilitation and efforts of improving functional capacity. And according to this paradigm, lumbar and cervical selective nerve blocks, facet joint injections, dorsal ramus medial branch injections and diagnostic disc injections may be used for determining the pain source.

The increasing need for diagnostic and therapeutic injections have led to the requirement of "interventional pain management" specialization. Many countries have started to accept pain medicine as a distinct specialization as a result of this requirement.

The development of interventional pain management techniques, and algology as a medical discipline, has accelerated during the last two decades. Although there were a few techniques applied for pain relief 20 years ago, today there are more than 45 modalities in daily medical practice.

The interventional pain treatment techniques which in the beginning were most commonly used in patients with pain resistant to analgesic medicines, started to cover the spinal region more than before along with the advancements in imaging techniques. While they were restricted to local anesthetic or corticosteroid injections to the facet joint, dorsal ramus medial branch, dorsal root ganglion in the beginning, with the development of technological devices like radiofrequency, cryotherapy more sophisticated techniques came to life. Pain specialty concept has developed in USA and Europe. Our country is one of the frontiers in this subject.

Together with many advantages of this paradigm aiming the functional improvement of the spine, today we are facing some new treats. Physicians who cannot realize the significance of the multidisciplinarity have begun to replace the ones who expected lots from the surgical treatment and diverge from the algorithm. Shifting from surgery to spinal injections, corticosteroid injections to every disorder, despising or skipping the physical rehabilitation is the flashback to the mistakes of the past.

Another matter is the shoddy discographies performed before spinal fusion operations undertaken to treat pain. Acquiescence of discographies that are almost reduced to injection of radioopaque solution to disk space, as a significant diagnostic tool has led to putting the blame on discography after a failed spinal fusion.

An era of performing procedures without the necessary education has started in spite of lacking randomized controlled trials of spinal injections. Pain programs depending solely on spinal injections has extremely increased. The treatment mechanical back pain has almost been reduced epidural steroid injections without proper indications.

Spinal injections prepare the necessary conditions for functional rehabilitation of the patient. This is the most important point not to be overlooked. Treatment of back pain is a multidisciplinary teamwork. The provocation of a single treatment modality by every discipline, just as done in surgical interventions and physical rehabilitation methods, is the greatest peril. The same is valid for

the scientific studies investigating the efficacy of these modalities. The studies about the injection techniques should look for the functional improvement of the patient and should not be restricted just to the efficacy of the injection technique.

Summary of present condition:

a. Under the light of new paradigms "interventional pain treatment techniques" have been developed and they may be performed effectively.

b. The development of algology – pain medicine specialty will provide more effective and proper application of these methods.

c. The inappropriate application of these methods has given birth to the peril of treating the patients solely with these methods.

d. Unfortunately the facts that interventional pain treatment techniques constitute an important part of functional rehabilitation and back pain treatment should be multidisciplinary are usually overlooked.

Future

Before commenting on future, to overview the spinal injection techniques in current medical practice is beneficial:

a. Epidural steroid injections done with the radiological guidance in lumbar and cervical disc herniation may prevent surgical treatment in selected patients if they are combined with physical rehabilitation.

b. Transforaminal injections may be effective in selected patients of lumbar and cervical bulging and protrusion.

c. The discrimination of facet joint complex as a pain source may be done by diagnostic injections and radiofrequency or other ablative techniques targeting the medial branch of dorsal ramus may be effective in facet syndrome.

d. Injection techniques may be helpful in the diagnosis of sacroiliac joint pain.

e. The differential diagnosis of discogenic pain may be done by discography (if performed properly).

f. An imaging method demonstrating the exact pathology in a painful disc, facet joint or another spinal structure has not been developed yet.

g. It is not possible to obtain an appropriate response to diagnostic techniques if the psychological status of the patient is not assessed before the procedure.

h. Inappropriate or inadequate application of interventional techniques may not only be ineffective, but also be harmful.

To most important point for the future is the satisfactory and effective education of the specialists who will perform the interventional treatment techniques, namely algologists. Algology is not the application of anesthetic nerve blocks. Algology is the application of nerve blocks with much different indications and expectations, and with specific knowledge and experience. For this reason algology education is crucial.

The long term outcome results of spinal injections are very important. These studies have been started recently as multicentric clinical trials. With the development of evidence based medicine, the demonstration of the effectiveness of these techniques will be possible.

The effectiveness of the agents used should also be investigated besides the techniques.

The development of imaging techniques is also significant. As mentioned before current techniques are inadequate especially for the visualization of the intradiscal changes.

It is also important to evaluate the chemical changes inside and near the disc. The indicators to determine such changes are not available yet.

Long term outcome results of injection techniques combined with physical rehabilitation may be regarded as the most important subject.

Conclusion

A shift from structural/functional paradigms to neuroanatomic/ functional paradigms is being observed in the treatment of spinal pain. It is a proven fact that the condition is not just a simple mechanical compression in mechanical back pain, thus surgery is not a definite solution. It is still debatable how much this fact is understood but we can say that neurosurgeons and other spinal specialists have started to see this condition.

The treatment of mechanical back pain is possible only by a multidisciplinary approach. None of the medical disciplines can cope with this important problem alone. The important point is to advance the diagnosis and treatment options available and to use these to correct patients with correct paradigms and correct timing. It obvious that the practical mistakes and prejudices that has been mentioned in the "past" era is still continuing "today".

Although spinal injections have taken its place in therapeutic armentarium, it is a tragic fact that it also has begun to take its share from mistakes and prejudices, as happened with other methods.

L068

WOMEN AND PAIN: GENDER DIFFERENCES, PAIN MANAGEMENT AND REHABILITATION: ONE SIZE DOES NOT FIT ALL!

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Gender is truly an important factor in the diagnosis and treatment of patients with chronic pain and musculoskeletal conditions. Within the last decade gender has become a "hot button" issue in research and scientific investigation. In fact, the United States of America, National Institutes of Health (NIH) held a conference on gender and pain to provide a synopsis of the research developments in this area. Research presented there made the following conclusions:

- Pain treatment that works for one sex may not work as well, or at all for the other.
- Women cope better with pain than men.
- Society's attitude toward men and women in pain may influence a physician's treatment.
- Women discuss pain more than men
- Being seen as "too emotional" may work against a woman and lead to inadequate care.
- Women experience more pain than men

There are several painful conditions which occur disproportionately more often in women than men, sometimes with more severe symptoms. Musculoskeletal pain in the upper limbs, shoulders, neck, and hips, is more common in women than men[14]. Arthritic disorders such as rheumatoid arthritis affects two to three times more women. Women are at higher risk for most kinds of severe foot pain. (This is largely due to

the fact that forty-four percent of women said they wear shoes that look good but don't fit well, according to a study by the American Podiatric Medical Association in 1992.) Temporomandibular disorders occur up to seven times more often in women and trigeminal neuralgia affects twice as many women as men. Women are also more susceptible to certain types of sports related injuries. Knee injuries occur two to eight times more often in women. Stress fractures and anterior cruciate ligament (ACL) tears are also common.

Women who play sports that require pivoting, such as soccer, volleyball, and basketball, have the highest injury rate – even higher than men who participate in these activities. Headaches are also a major cause of pain. Nearly one in five women suffer from migraine headaches (three times as often as men). Migraine headaches in women also have a tendency to be more frequent and more disabling. Chronic tension headaches occur in five percent of women compared to two percent in men, and women report a higher level of tenderness in the muscles around the skull.

Women are also more prone to osteoarthritis, systemic lupus erythematosus, systemic sclerosis, fibromyalgia, carpal tunnel syndrome, facial pain, and osteoporosis. Several painful conditions such as endometriosis, menopause, labor and childbirth, breast-feeding, mastitis, chronic pelvic pain, fibrocystic breast disease, breast pain, dysmenorrhea, and premenstrual syndrome, are found exclusively in women. Physical and hormonal changes during pregnancy can trigger or exacerbate painful conditions as well. For example, during pregnancy, post-partum, and breast-feeding, women are more susceptible to some types of peripheral neuropathy, such as Bell's palsy and meralgia paraesthetica. Carpal tunnel syndrome occurs in 20 to 40 percent of pregnant women due to fluid retention. Additionally, the weight gain and shift in center of gravity, which occurs during pregnancy, can also create foot problems.

In some cases, women and men suffering from the same condition report different symptoms. One common example is heart disease. Women less frequently suffer chest pain, and instead suffer from back, neck, and jaw pain, along with more severe nausea, vomiting, abdominal complaints, fatigue, and shortness of breath.

The anatomical, physiological, biochemical, hormonal, and genetic factors responsible for gender-based differences in pain perception and response to treatment are beginning to be pieced together by researchers. Anatomically, women are "built" differently than men. The pelvis is wider, with a broader hip structure, and a significant difference in body fat distribution. Women also have a slightly varied leg alignment (femoral, tibia, and fibula placement), increased knee valgus, and greater joint laxity, all of which contribute to increased stress on the knees and a greater risk of sprains, strains, and dislocations.

Hormones also play an important role in one's experience with pain. Many structural, developmental, and anatomic differences between men and women are due to the endocrine system and hormone levels. In both the peripheral and central nervous system, hormones contribute to processing nociceptive signals[7]. Progesterone can influence norepinephrine, serotonin and dopamine levels. Neuromodulators such as substance P, glutamate, and gama-inobutyric acid, which are critical in pain processing, are also affected by progesterone. Endorphins may also be affected by sex hormones[5]. The fluctuation of hormones during a woman's menstrual cycle can have a dramatic effect on her pain experience. During the premenstrual phase, some conditions such as irritable bowel syndrome, headaches, rheumatoid arthritis, and fibromyalgia are exacerbated. A woman's hormonal cycle can also cause laxity in the ligaments, soft tissue structures, and support structures of the body, which makes her more susceptible to injury and contributes to already existing painful conditions.

Women may be "better" patients. Studies indicate that women are better able to discriminate between different types of pain[6]. They also verbalize their pain complaints more often and are more articulate at describing their pain. The ability to effectively describe their pain facilitates an accurate diagnosis and an appropriate rehabilitation program. Women are frequently better at coping with pain and adept at trying creative strategies for dealing with pain; meaning women patients may be more willing to try complementary alternatives to traditional medicine, such as acupuncture, massage therapy, dietary strategies, mind/body therapy, etc.

Gender may be an important consideration when prescribing pain medications as well. In a recent study, one of the most widely used pain relievers – ibuprofen – was less effective at providing pain relief for women than men. In addition, a study on morphine demonstrated that, when given the same dosage of morphine, men experienced more pain relief during the first hour, while the women had no pain relief. However, the effects of the morphine quickly wore off in the men, but lasted longer for the women. The explanation for this is unclear, but it is likely that further testing ill reveal that many drugs "work" differently in men and women.

The above discussion is based on Dr. Young's new book "Women and Pain: Why It Hurts and What You Can Do" (Hyperion)

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L069

INVASIVE TREATMENT MODALITIES FOR SPINAL CORD INJURY PAIN

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One wonders why a larger impact on the understanding and treatment of spinal cord injury (SCI) pain has not been made during the last decade. Actually, contributions have been made, but the root cause of pain is still unknown and the efficacy of treatment in the SCI patient is not predictable. After SCI, pain develops in approximately 60 to 70% of individuals, and approximately one-third of patients report severe pain. Of the group reporting severe pain, 60 to 65% of patients continue to suffer from pain after 12 months. Often, SCI pain is not initially present after injury but appears during rehabilitation. Patients not uncommonly return months later with pain-related symptoms. Three primary types of post-SCI pain have been characterized: SCI with diffuse pain below the lesion, SCI with segmental deafferentation presents as transitional zone pain and pain due to the Syringomyelia.

Hyperexcitability of central nociceptors may result from SCI, leading to both spontaneous and evoked pain. The presence of spontaneous and evoked pain most probably indicates disturbances in both spinal and supraspinal pathways. Patients with SCI may also experience loss of sensations mediated by spinothalamic pathways in addition to developing abnormal pain perception.

When post-SCI pain is evaluated, it is important to consider other possible causes, which may include nerve root entrapment, cauda equina damage, visceral pain, secondary overuse and pressure syndromes, and muscle spasm/spasticity.

Assessment and treatment of the patient with SCI pain may be better approached through a tiered system by first identifying the pain type, second by identifying broadly the organ system involved, and third by further defining the specific structures or pathology involved

Commonly recognized causes for nociceptive pain include mechanical instability of the spine, muscle spasm/spasticity, secondary overuse syndromes, and visceral pathology. Neuropathic pain may be caused by nerve root entrapment, segmental/partial cord damage at the level of injury, diffuse/complete cord damage at the level of injury, cauda equina injury, and visceral involvement through sympathetic and vagal nerve input. The delayed onset of vague symptoms of neuropathic pain may result from the development of a syrinx.

There is no single treatment modality that can manage all the different post-SCI pain states. Some syndromes are easier to treat, while some are notorious for their intractability. The problem in assessing the value of any particular treatment for any of these syndromes is how precisely and thoroughly patients were described in accordance with the criteria for the particular pain syndromes.

In transitional zone pain, anaesthetic blocks are employed diagnostically and repeatedly as a therapeutic option. Spinal blocks have been employed for all SCI pains and usually provide, as expected, temporary and frequently only a partial relief of pain Intrathecal baclofen is very useful in alleviating spasms. However, it has only at best a mixed effect on pain. Diagnostic anaesthetic blocks are of no prognostic value as further deafferentation is not a desired goal. Although there has been much debate regarding sympathetic system dysfunction or its preservation as a pain ascending system, this has never been proven and sympathetic blocks are not routinely required. Nevertheless, some patients receive a significant temporary decrease of evoked pains with local, regional and sympathetic blocks.

In some cases, stimulation techniques may also be useful such as low- and high-frequency TENS, and spinal cord and deep brain stimulation. Recent animal study data indicate that stimulation of the spinal cord, in certain types of SCI and peripheral nerve injuries, increases levels of GABA, which acts as an inhibitory agent in neuropathic pain conditions. Many reports and retrospective reviews have indicated that spinal cord stimulation may play a selective role in the treatment of SCI pain. Cortical stimulation should be pursued by a functional neurosurgeon with experience in the field of pain. All patients should be evaluated with validated scales and successful cases should be submitted to sham stimulation.

Nerve lesioning and brain or spinal stimulation may be treatment options to consider when pharmacotherapy has been unsuccessful. Transection of spinal nerves (e.g., dorsal root entry zone lesions) or cordotomies are used primarily for patients with intractable cancer-related pain. Unfortunately, when these methods are used to treat chronic pain, patients do well for about a year but after 2 years 60 to 80% have recurrence of pain, which is more difficult to manage after that time.

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L070

TECHNIQUES OF REGIONAL ANAESTHESIA IN REHABILITATION MEDICINE

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TARGET OF NERVE BLOCKS (NB)
Sensory – management of pain
Sympathetic – management of simpathetically maintained pain (SMP)
Motor – spasticity or trigger points

MANAGEMENT OF PAIN
Diagnostic
Prognostic
Therapeutic
DIAGNOSTIC NB
Ascertain specific nociceptive pathways
Help determine possible mechanism of chronic pain
Aid differential diagnostic of site and cause of pain

Determine patients reaction to pain relief (psychological evaluation)
PROGNOSTIC NB
Predict effects of neurolytic block
Predict effects of nerosurgery
Determine change in behovior and affect in the absence of pain and analgesic medication
Degree of physical limitation unrelated to pain
Evidence of narcotic dependence and its severity
THERAPEUTIC NB
Only after nature and location of pain is established by diagnostic blocks
Allow normalisation of posture through muscle relaxation
Allow the patient to perform other therapeutic procedures (e.g. therapeutic exercise)

MANAGEMENT OF SPASTICITY

Neurochemical agents: local anesthetics, alcohol 30-50%, phenol 3-5%, neurotoxins: botulinum toxin A&B
Diagnostic
Prognostic
Therapeutic
Nursing
DIAGNOSTIC
Clinical examination may be insufficient
Spasticity versus: contracture, pain, heterotopic ossification
PROGNOSTIC NB
Predicts effects of neurolytic blocks or surgery
Allows patient to experience the new muscular situation
THERAPEUTIC
Increased ROM
Decreased clonus
Increased speed and dexterity of movement
NURSING
Facilitates patient positioning
Facilitates personal hygene
Makes nursing more easy
UPPER LIMB NERVE BLOCKS
Musculocutaneous: diminishes elbow flexion (hemiplegic)
Median: relax wrist and finger spasticity
Brahial plexus (interscalenic) personal hygiene, facilitates shoulder abduction
LOWER LIMB NERVE BLOCKS
Obturator: reduce adductor tone, diminishes scissoring gait, facilitates personal hygiene
Femoral: diminishes genu recurvatum (individual branches can be blocked)
Sciatic: diminishes internal rotation and genu flexum in paraplegics
Perineal: reduces postvoid residual volume in spastic external sphicter
Tibial: diminishes equino-varus ankle posturing; diminish painful clawing of toes allowing better tolerance of AFO
Lumbar spinal nerves: paravertebral block to reduce lower limb spasticity
Nerve Blocks should only be used as an *adjunct in the comprehensive treatment* of the patient, offering a "*therapeutic window*"for other rehabilitation procedures to be applied.

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L071

PHYSICAL THERAPEUTIC MODALITIES IN PRM: EVIDENCE BASED UPDATE

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Evidence-based physical therapy has become feasible with the increase, in the volume and accessibility of high-quality clinical research in recent years. One measure of the growth of evidence is that the Physiotherapy Evidence Database (PEDro) (www.pedro.fhs.usyd.edu.au) now contains 398 evidence-based clinical practice guidelines, 3,920 randomized controlled trials (RCTs), and 713 systematic reviews that are relevant to the practice of physical therapy, 47% of which have been published since 1998. The earliest trial in physical therapy is Colebrook's 1929 trial of ultraviolet irradiation for prevention of colds and infectious diseases. Since then, many trials have been made in the area of physical therapeutic modalities. Yet, the quality and quantity of research in the field still remains to be a concern. Completed studies may not have been published, published studies may be difficult to identify or retrieve, and relevant studies may not be available in the language of the user. Inspection of the Cochrane Central Register of Controlled Trials reveals that many RCTs in physical therapy are completed but never published. Among the ones that are published, the small sample sizes, variable methodological quality and heterogeneity in terms of population studied, physical therapy intervention employed and length of follow up of randomized controlled trials of physical therapy interventions result in little overall evidence to guide treatment.

Another concern is that the developments in clinical practice have not kept pace with the increase in availability of evidence and physical therapy practice has not changed as much as it might. Several studies have examined the use of evidence in clinical decision making over the past decade. A review of these studies indicates that much practice is still not evidence-based.

Most of the evidence based data is retrieved from research on the effect of physical modalities on chronic low back pain and knee osteoarthritis (OA). The effectiveness of physical modalities for other chronic pain conditions needs to be evaluated more completely. According to the available data, the effect on pain by various modalities is generally strongest in the short-term period immediately after the intervention series, but effects can last as long as 1 year after treatment. Older and younger adults often experience similar effects on their perception of pain from treatment with physical modalities. Therefore, use of these modalities for chronic pain in older adults is appropriate, but special precautions need to be taken. Practitioners applying physical modalities need formal training that includes the risks and precautions for these modalities.

Evidence-based clinical practice guidelines (EBCPG) on selected rehabilitation interventions for different conditions such as knee pain, low back pain (LBP), neck pain and shoulder pain have been published. The Cochrane database also provides evidence-based data for physical therapeutic modalities in the treatment of musculoskeletal conditions. According to the EBCPG, two positive recommendations of clinical benefit were developed for knee pain: (1) transcutaneous electrical nerve stimulation (TENS) and therapeutic exercises were beneficial for knee OA, and (2) there was good agreement with these recommendations from practitioners (73% for TENS, 98% for exercises). For several interventions and indications (e.g. thermotherapy, therapeutic ultrasound, massage, electrical stimulation), there was a lack of evidence regarding

efficacy. Current evidence suggests that electrical stimulation therapy may provide significant improvements for knee OA, but further studies are required to confirm whether the statistically significant results shown in these trials confer to important benefits.
Based on the results of trials exhibiting a sufficient level of quality, treatments that were effective in decreasing pain and improving function in patients with patellofemoral pain syndrome were acupuncture, quadriceps strengthening, the use of a resistive brace, and the combination of exercises with patellar taping and biofeedback.
The evidence-based primary care options for chronic LBP are exercise, laser, massage, and spinal manipulation; however, the latter three have small or transient effects that limit their value as therapies. In contrast, exercise produces large reductions in pain and disability, a feature that suggests that exercise should play a major role in the management of chronic LBP. Physical treatments, such as acupuncture, back school, hydrotherapy, lumbar supports, magnets, TENS, traction, ultrasound etc. are either of unknown value or ineffective and so should not be considered. The evidence for the use of traction in LBP remains inconclusive because of the continued lack of methodological rigor and the limited application of clinical parameters as used in clinical practice. There is evidence from the limited data available that TENS and acupuncture-like TENS reduces pain and improves range of motion in chronic back pain patients, at least in the short term. There is insufficient evidence to recommend massage as a stand-alone treatment for non-specific low back pain. Further trials, which give attention to these areas, are needed before any firm conclusions and recommendations may be made. Because of heterogeneity and the varying quality of the studies no strong evidence exists concerning the effect of physical therapy interventions on the prevention and treatment of back and pelvic pain related to pregnancy.
Further well-designed RCTs are warranted regarding the use of several interventions for patients with neck pain and shoulder pain where evidence was insufficient to make recommendations. Based on anecdotal evidence or small observational studies, physical therapy may reduce overloading of the muscle system, improve postural fatigue and positioning, and condition weak muscles in fibromyalgia syndrome. Modalities and whole body cryotherapy may reduce localized as well as generalized pain in short term.
Systematic review assessing the evidence base for widely used cryotherapy in the treatment of acute soft-tissue injuries revealed marginal evidence that ice plus exercise is most effective after ankle sprain and postsurgery. Few studies assessed the effectiveness of ice on closed soft-tissue injury, and there was no evidence of an optimal mode or duration of treatment.
Although electrotherapy has a well established role within physiotherapy practice, the current concepts that influence its application vary considerably from those proposed historically. It is argued that there is a place for electrophysical modalities in contemporary practice, and several basic principles are considered together with more specific information regarding two modalities namely, ultrasound and interferential therapy. Electrophysical agents are utilized to bring about physiological effects, and it is these changes which bring about the therapeutic benefit rather than the modality itself. Therapeutic ultrasound is one of the most common treatments used in the management of soft tissue lesions, which constitute the majority of rheumatic complaints. Although many laboratory-based research studies have demonstrated a number of physiological effects of ultrasound upon living tissue, there is remarkably little evidence for benefit in the treatment of soft tissue injuries. The results of 2 trials suggest that therapeutic ultrasound is more effective in treating some clinical problems (carpal tunnel syndrome and calcific tendinitis of the shoulder) than placebo ultrasound, and the results of 8 trials suggest that it is not. This may be related to several confounding factors, including technical variables, the complexity and variety of underlying pathologies in soft tissue lesions, methodological limitations of clinical studies, or true lack of effect. Ultrasound therapy is also a widely available and frequently used electrophysical agent in sports medicine. However, systematic reviews and meta-analyses have repeatedly concluded that there is insufficient evidence to support a beneficial effect of ultrasound at dosages currently being introduced clinically. Consequently, the role of ultrasound in sports medicine is in question. This does not mean that ultrasound should be discarded as a therapeutic modality. However, it does mean that we may need to look in a new direction to explore potential benefits.
The applications of ultrasound to enhance the delivery and effect of some therapeutic drugs (phonophoresis) have also been discussed in the literature. Despite extensive clinical experience, there is controversy regarding the efficacy. In our recent RCT on ibuprofen phonophoresis, no additional effect could be observed over conventional ultrasound in patients with knee OA. Yet, new experimental evidence suggests that recently developed contrast agents can be used as exogenous cavitation nuclei for enhancement of drug and gene delivery via ultrasound. The success in this new method positions ultrasound as a potential therapeutic tool for drug delivery in the future.
When interpreting the results of research studies, it is important to distinguish between situations where there is "evidence of no effect" (i.e., a number of well-designed, adequately powered studies showed that a particular intervention did not have a clinically important effect in a particular setting) and situations where there is insufficient evidence to judge intervention effectiveness (i.e., there have not been enough well-designed, adequately powered studies to assess the effect of a particular intervention in a particular setting). In the first situation, the confidence interval is narrow and includes the point of nonsignificance, so we can be fairly confident that the intervention is ineffective. In the second situation, we do not know whether the intervention is effective, ineffective, or harmful, because the wide confidence interval includes all of these possibilities. Anecdotally, these 2 concepts seem to be commonly confused by clinicians and, particularly, by health care policy makers. The distinction between the 2 situations is much clearer in studies in which confidence intervals about estimates of treatment effect size are reported.
There are many reasons why research evidence may not translate into evidence-based physical therapy. These reasons include current health policies, the complexity of physical therapist practice, incomplete access to the evidence, difficulty interpreting the evidence, organizational barriers, and ineffectual continuing education programs. Many of these problems are not unique to physical therapy. Some strategies could be adopted by researchers, editors, reviewers, managers, and clinicians to overcome these barriers. These strategies include facilitating the publication of all research, use of an optimum format for reporting research, maximizing the efficient use of electronic databases, improving health professionals' skills in critical appraisal of published research, and fostering consumer access to evidence.

L072

PHENOL BLOCKS IN MOTOR POINTS OR NERVE

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In disabled persons due to central nervous system disorders (stroke, TBI, SCI, etc.) a good control of spasticity is of great importance for improving functional outcome.
This presentation will focus on chemical neurolysis of motor points and nerves with phenol 5% diluted in water.

The technique is derived from procedures in regional anesthesia, when local anesthetics are used to block conduction in motor and sensory peripheral nerves to permit surgical intervention.

For management of spacticity phenol blocks are used for therapy and nursing. Prior to that, for diagnostic and prognostic purposes, a local anesthetic can be used when clinical examination is insufficient to decide between spasticity, contracture, pain, or heterotopic ossification, or when we want to predict the effects of neurolytic blocks or surgery and aallow patients to experience the new muscular situation.

Phenol can be used at different levels with advantages and disadvantages for each level:

peripheral nerve

motor point

branch of motor nerve to the muscle with spasticity

Using a peripheral nerve stimulator improves the precise localization of the peripheral nerve or motor branch which allows injecting only small amounts of phenol. The stimulator and the technique are presented. A special needle is used for localization and injection of phenol.

The technique is efficient in diminishing spasticity for a few weeks to 2-3 months, cost effective compared to botulinum toxin, but very time consuming.

L073

BIOFEEDBACK AND CONSTRAINT INDUCED MOVEMENT THERAPY IN HEMIPLEGIC PATIENTS

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Biofeedback is a method of treatment that uses electronic or electromechanical instruments to properly measure, process and feedback to individuals in the form of auditory and/or visual feedback signals by using information about their normal and/or abnormal neuromuscular or autonomic activity. Biofeedback treatment is used to help individuals develop greater awareness of and an increase in voluntary control over their physiological processes that are otherwise involuntary and unfelt events.

In rehabilitation although EMG biofeedback is the most widely used technique, others such as positional, angular, pressure, temperature and electroencephalographic biofeedback systems have also been successfully used.

EMG biofeedback has gained a firm place in the treatment of upper motor neuron lesions, particularly in retraining muscles and inducing relaxation of spastic muscles. EMG biofeedback improves functional outcomes in patients with hemiplegic stroke. It is also used in musculoskeletal problems like patellofemoral pain, temporomandibular disorders, postsurgery of meniscus and anterior cruciate ligament tears.

Constraint induced movement therapy, which involves intensively training use of the affected limb by repetitive use and shaping procedures, was proven to produce a use-dependent cortical reorganization by neuroimaging and transcranial magnetic studies. According to the system's theory, integration of many systems - including central nervous system - by repetitive practice of functional and goal-directed activities, results in organized and normal movement. In biofeedback therapy, although patients might not work on meaningful performance of activities, repetitive and concentrated practice that might be playing a role in brain plasticity is the main principle. In order to understand the mechanisms of recovery obtained by biofeedback treatment, neuroradiological studies investigating cortical reorganization are also needed. These will also help us to improve our knowledge about the neuromuscular treatment approaches.

Constraint induced movement therapy (CI therapy) is a relatively new rehabilitation technique that has been developed for the treatment of upper extremity of stroke patients with mild to moderate hemiplegia. CI therapy is one of the therapeutic approaches emerged from Bernstein's Dynamic Systems theory. Dynamic systems are defined as "interacting systems which need to work together in an integrated fashion with shifting dominance determined by the challenge of the functional task." The underlying assumption is that motor development emerges from interactions among the musculoskeletal system, the neuromuscular system, and sensory systems. The environment influences how these systems respond. Movement is not regulated by a central command; rather, functional systems emerge through the process of engaging in activity. Physical interaction with the environment and cognitive processing during such interaction play an integral role in determining how movement patterns develop and are learned. Movement emerges through interactions among the systems and with the environment; thus movement is a dynamic process. Goal-directed interactions with objects in the environment lead to self-organized movement. When we examine the characteristics of hemiplegic patients from a dynamic systems viewpoint we can recognize that they have many intrinsic and extrinsic constraints. Besides the neural integrity of the patient, the movement of the unimpaired hand may be an important intrinsic constraint. A number of extrinsic constraints including the context, the task demands, and environmental support may influence the movement of the hemiplegic limb.

CI therapy is an intensive therapy technique that aims to modify the movements of the affected limb by motor restriction of the movement of the unimpaired hand while concurrently training the affected limb by general task practice and shaping procedures and giving rise to concentrated, repetetive use of that limb. The uninvolved upper extremity is restrained by a padded mitt or a sling 90% of entire day for 10 to 14 days and the involved upper extremity is taken through extensive massed therapy during this period. In this context shaping is used with the goal of influencing motor learning and each motor learning objective is approached in small steps by successive approximations. Basically, a task is gradually made more difficult in accordance with a subject's motor capabilities. The effectiveness of CI therapy for improving upper extremity motor function in stroke patients with hemiplegia was validated by numerous studies and most work thus far have focused on upper extremity rehabilitation in chronic stroke patients who have minimal to moderate involvement of the affected extremity. Sub-acute and acute stroke patients with mild to moderate upper extremity involvement, pediatric patients with cerebral palsy are some other populations being researched. Results from CI therapy research suggest that CI therapy influences quality, quantity, speed, and skill of movement and importantly increases the amount of use of the involved upper extremity in the real life situation. The two different but linked primary possible mechanisms proposed for the effects of CI therapy are: 1. Overcoming learned non-use, 2. Inducing use-dependent cortical reorganization.

Although CI therapy is an innovative and effective treatment that would improve the functional ability of a significant number of individuals with hemiplegia; patient compliance, practical and effective implementation of CI therapy in the current practice settings, adaptation of the therapy to different cultures and countries with different health care policies are some important issues that need to be addressed. The ongoing multicenter randomized controlled researches will allow us to find out the realistic outcomes of this therapy.

L074

EVIDENCE BASED CLINICAL APPLICATIONS OF LOW LEVEL LASER THERAPY

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The word LASER means Light Amplification by Stimulated Emission of Radiation. Sunlight is mixture of several colours, whereas laser light is always of one single colour. This property gives its monochromatic characteristic. Sunlight is disorderly whereas laser light is very orderly and this gives its coherent property. Laser light runs parallel unlike sunlight. The healing properties of laser light are said to come from these differences.

Low level laser therapy (LLLT) refers to the use of low powered laser light, in the range of 1-1000 mW at wavelengths between 632 nm and 904 nm to stimulate a biological response. The emitted energy becomes absorbed by the tissues of the body, stimulating their metabolic processes.

Karu (1) emphasises three principle ways of activating individual cells by laser light. 1) The photobiological action mechanism with stimulation of the respiratory chain is a universal mechanism. Primary photoacceptors are known to be terminal oxidases and NADH-dehydrogenase. Primary reactions with a photoacceptor molecule lead to photobiological responses at the cellular level through cascades of biochemical homeostatic reactions that are cellular signalling or photosignal transduction and amplification chain. This type of cell metabolism activation occurs in the direction of greater oxidation. The capability for activation depends on the physiological status of irradiated cells. Cells who have redox potential with a reduced state are more sensitive to irradiation. 2) Other redox chains in cells can also be activated with irradiation. Irradiation initiates a non-mitochondrial respiratory burst through activation of NADPH-oxidase located in plasma membrane of these cells. 3) Direct activation of cells leads to indirect activation of other cells. This occurs with secondary messengers released from activated cells.

As a consequence, Takac and Stojanovic (2) claimed the following general effects of LLLT:

(1 Anti-inflammatory, analgesic and anti-edematous effect on tissues;

(2 Absolute increase in microcirculation, higher rates of ATP, RNA and DNA synthesis, and thus better tissue oxygenation and nutrition;

(3 Increase in the absorption of interstitial fluid, better tissue regeneration and stimulation of the analgesic effect.

Lasers produce nonionizing, electromagnetic radiation. Laser light has been reported to penetrate human tissue in the ranges of 8-15 mm, but the majority of the light will be absorbed within the first 4 mm. Although this may seem superficial, it should be noted that chemical processes may be initiated and mediate physiological effects at a deeper level. This property is different in various types of laser with different wavelengths. When choosing a laser device it should be taken into account that each wavelength has a different effect on different types of tissue because of the amount of stimulation due to depth or density. For example skin structures best benefit from a laser device with wavelengths of 635 nm., muscle 660 nm and bone 830 nm. Here are some of the commercially available LLLT devices:

- •He Ne laser 633 nm
- •GaAlP laser 635, 650,660, 670 nm
- •GaAlAs laser 780, 820, 830 nm
- •GaAs 904 nm

LLLT is used by physiotherapists to treat a wide range of acute and chronic musculoskeletal painful pathologies, by dentists to treat inflamed oral tissues and to heal ulcerations, by dermatologists to treat edema, indolent ulcers, burns, and dermatitis, by rheumatologists to relieve pain and treat chronic inflammations and autoimmune diseases. It is widely used in veterinary medicine and in sports and rehabilitation clinics to reduce swelling and hematoma, relieve pain, improve mobility and treat acute soft tissue injuries. The first publications on the effect of LLLT appeared more than 30 years ago. Since then approximately 2000 studies have been published. However, still a controversy exists on the efficacy of LLLT. There have been doubts among some of the physicists on the particular role of coherent laser irradiation acting upon biological objects. The other reasons for doubts are the universality of clinical use of LLLT as well as numerous physiological effects and the wide range of indications. According to the authors standing against the efficacy of LLLT, published systematic reviews of the evidence have concluded that there is a lack of adequate evidence of effectiveness of LLLT for the treatment of many pathological conditions including wounds and pain in rheumatoid arthritis or other musculoskeletal conditions. However, on the other hand, the supporters conclude that the existence of evidence for and against the efficacy of LLLT is not surprising as in most areas of biology and the balance seems to be positive. Tuner and Hode (3) studied 1200 papers on LLLT and found 85 positive and 35 negative double-blind studies.

Despite the need to restrict the LLLT treatment energies to a few J/cm2 and power to 50mW or less, a wide variety of laser types, treatment schedules, and techniques have been used. The field is characterised by a variety of methodologies with different parameters (wavelength, output power, continuous-wave or pulsed operation modes, pulse parameters). As a consequence, apparently conflicting results from studies may represent fundamental, but poorly understood differences in treatment approaches. This is the general problem interpreting the results of LLLT studies. A Cochrane review of LLLT in osteoarthritis included five trials, and concluded that despite some positive findings, the meta-analysis lacked data on how LLLT effectiveness was affected by the important factors of wavelength, treatment duration, dosage and site of application (4).

As there is still a big gap in the basic research area, future studies should be planned in this field. In clinical studies, used parameters should be based on previous bibliography, information should standardisedly be given, different research groups should work with similar conditions. It is, now, time to speak the same language.

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L075

ROLE OF ORIENTAL MEDICINE AND ALTERNATIVE MEDICINE IN REHABILITATION MEDICINE

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The ultimum goal of eliminating diseases and maintaining normal health is same both in western medicine, oriental medicine and alternative medicine. At the present time, the western medicine tends to take more scientific technological approach in their practice while the oriental medicine still maintain more humanistic approach. 5000 year old traditional medicine still challenges the 21 century scientific

modern medicine in the field of clinical practices. The "disease-oriented" western medicine classify the human condition as "diseased and non-diseased" states. In the mean time the "health-oriented" oriental medicine classify it into "healthy and unhealthy" states.

For the maintenance of normal health, five principles are emphasized. They are ① eat right, ② move right, ③ sleep right, ④ breathe right, and ⑤ mind right. To reverse an unhealthy condition back to normal healthy state, the methods of ① natural substance therapy, ② exercise therapy, and ③ stimulation therapies including acupuncture, moxibustion, finger pressure, and cupping techniques. In order to eliminate the diseases, four distinct approaches namely ① chemical, ② physical, ③ psychological, and ④ surgical treatments are utilized.

Recent international trend of globalization has brought an information explosion and transcultural exchange of science, technology, arts and medicine. There are so many different kinds of traditional medicine, hidden popular folk medicine, and various less recognized techniques and theories of healing arts. Some are originated in oriental culture while others are originated in western culture. Experts of western medicine claim that only those informations clarified or proven by the objective and scientific methodology can be recognized as a part of western (orthodox or conventional) medicine. All kinds of traditional medicines, folk medicines, and many other fragments of medical techniques and theorie! s are collectively labelled as "alternative medicine or complementary medicine".

There are clear evidence that the western medicine, oriental medicine, and alternative medicine all are complimentary to each other, and that alternative medicine and rehabilitation medicine share much in common regarding "whole person oriented" and "integrative approach". If and when all the complimentary components existing in various healing arts together in one medicine, a new integrated comprehensive wholistic medicine can be produced and useful in the field of rehabilitation medicine.

L076

THE ELECTRODIAGNOSTIC PROCEDURES USED IN ASSESSING FACIAL NERVE LESIONS AND THE PRINCIPLES OF PHYSICAL MEDICINE & REHABILITATION IN MANAGING FACIAL NERVE PALSY

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Part I: Electrodiagnosis in Facial Palsy

In facial palsy, the neurophysiologic status of the facial nerve determines the prognosis. Thus, electrodiagnostic testing has been used in selecting patients for treatment and in predicting outcome. The most commonly used electrical tests include:

1) The minimal nerve excitability test: This test depends on the same principle as the maximal stimulation test. In neurapraxia, the nerve trunk distal to the block continues to respond to stimulation & transmit an impulse; where as with axonotemesis; the nerve trunk gradually loses its ability to respond to stimuli over a period of 3-5 days following the onset of damage. In this test, the facial nerve is stimulated percutaneously at the stylomastoid foramen using 0.2-1 ms square pulses. The minimal current intensity that is required to obtain a minimal visible response or muscle twitches (threshold intensity) on the healthy side is compared to that on the affected side.[1,2] Abnormal test is considered when the nerve loses its excitability (complete nerve degeneration) or the difference between the minimal intensities of both sides is 2-3.5 mA or more (partial nerve degeneration) according to different authors.[2,3] This test is subjective, but easy to perform at low cost (can be done with any nerve stimulator). However, some investigators have questioned the accuracy of this test in determining the prognosis of facial palsy.[4,5] This is because a few intact axons may give a visible response leading the clinician to predict a good prognosis, when in reality most of the fibres are degenerating. Thus, it may be considered inferior to the maximal stimulation test.

2) The maximal stimulation test: It is a subjective, but an excellent way for evaluating facial nerve degeneration after the onset of palsy.[4] It can be done with any stimulator in which the strength & duration of the stimulus can be varied (usually square pulses of 0.1-1 ms duration are used). Thus, it is an economic method of evaluation, but the doctor who perform the test should have good experience in doing it. Each of the facial nerve branches (to forehead & eye brow; to periorbital area; to check, upper lip & nasal ala; and to lower lip & platysma) are stimulated at the face using 1-5 mA current intensity and the response (muscle twitch) is observed. Once the patient tolerate the above described stimulation, the proximal part of the extracranial portion of the facial nerve trunk (at the stylomastoid foramen) should be stimulated with higher current intensity, and the amount of muscle twitch in response to supramaximal stimulation is observed. The response on the involved side is compared to that on the healthy side for each area tested. Scoring of response is usually done as follows: equal, minimally decreased, markedly decreased or absent. The test is usually done on day 3, 5, 7, 10 & 14 after the onset of paralysis (in herpes zoster infection, nerve degeneration may progress over 2 weeks).[6] It was observed that when the responses remained equal bilaterally up to 10 days post onset in Bell's palsy, 92% of patients had complete return of function; and when the response was lost within 10 days there would be incomplete return of function. Also, it was reported that when the response was markedly decreased, 73% of patients had incomplete return of function.[7]

3) Electroneuronography (ENoG): This technique may also be called evoked electromyography. ENoG has the advantage of having a permanent record (graph) which is important for the patient follow up assessment. Also, it provides an objective quantitative assessment of the facial nerve degeneration. Therefore, it is a reliable test for predicting prognosis in facial palsy (it may be considered the most accurate prognostic test).[6] It records the compound action potential (CAP) and the facial nerve latency after transcutaneous stimulation of the facial nerve (usually at the stylomastoid foramen behind the neck of the mandible) using a 0.1-0.5 ms square pulses delivered at a rate of 1 pulse/s. Always, the current intensity is supramaximal. The CAP can be recorded from many facial muscles (such as the orbicularis oris, orbicularis oculi, frontalis, nasalis) using surface recording electrodes placed at the target muscle. However, the recording electrodes are commonly placed over nasal alae[6] or the nasolabial fold (where the active recording electrodes are placed lateral to ala nasi or lateral to the mid point of the nose). Sometimes, the tip of the nose is chosen for the reference electrode. The amplitude of CAP is usually recorded peak to peak, but sometimes from the baseline to the negative peak of the muscle response. The percent decrease of the CAP amplitude on the affected side compared to the control side is usually calculated. It represents the percent of the degenerated facial nerve fibres innervating the muscle from which CAP is recorded. It is very important in predicting the prognosis of facial palsy if done 7-10 days after the onset of paralysis. The latency is the time taken for the impulse to travel along the facial nerve from the site of stimulation to the site of recording. It is usually measured from the stimulus artefact to the start of deflection of CAP. Also, side to side comparison for the facial nerve latency is important. Increased facial nerve latency occurs in facial nerve diseases. Most investigators agree that the percent decrease in CAP amplitude on the affected side is a reliable

indicator for prognosis in facial palsy.[6,8,9] It is generally agreed that most patients with <90% facial nerve degeneration will recover nearly completely.[8] However, sometimes there is little variability in this concept. It was mentioned that when the CAP amplitude decreases to <25% of that on the healthy side (i.e. there is >75% nerve degeneration), recovery would be delayed & might be incomplete. Also, when the CAP amplitude was <10% of that recorded from the healthy side, incomplete recovery (with high incidence of synkinesis) was observed in nearly all patients.[6] It was also reported that patients usually have recovery that is equivalent to or better than the recovery predicted by ENoG, and that almost all patients (irrespective to their ENoG findings) show some signs of improvement within 6 months.[10] The variability present in the literature might have been due to the fact that the CAP in most of the cases is being recorded from only one facial muscle, thus indicating the degree of denervation at that muscle. This does not always correlates with the degree of denervation in the other facial muscles. For accurate assessment of denervation, one might record CAP from different facial muscles. If there is a significant abnormality, needle EMG may be done for the muscle that shows abnormality to detect signs of denervation and to explore the degree of recruitment of motor unit action potentials (MUAP) from the involved muscles. One published article suggested that EMG is important in facial nerve assessment, possibly because of the above mentioned suggestion.[11] On the other hand, ENoG may not be useful in evaluating return of function since facial function may return without return of a recordable evoked potential. [6]

It should be noted that the above mentioned three tests do not show any abnormality until 3-10 days after nerve injury or the onset of paralysis. In complete facial nerve severance, the facial nerve continue to respond to electrical stimuli applied distal to the site of lesion until degeneration is complete. Nerve degeneration sometimes becomes complete as late as 3 weeks following injury. Also, these tests are mainly used for unilateral paralysis because they depend on comparing the affected side to the unaffected side.

4) Facial nerve conduction velocity: It may be useful when side-to-side comparison should be avoided as in bilateral & alternate palsies. The facial nerve is stimulated at two points. First the nerve trunk is stimulated at the stylomastoid foramen; and second the marginal mandibular branch of the facial nerve is stimulated at the angle of the mandible. Recording is done using concentric needle electrode inserted at the mentalis muscle. The nerve conduction velocity (NCV) in m/s is calculated by dividing the distance between the two stimulation points (in mm) by the difference in latencies (in ms). The normal value is 48±5 m/s. It was reported that when the degree of denervation as measured by ENoG did not exceed 60%, NCV was in the normal range. Incomplete recovery was common in Bell's palsy patients when the NCV was below 30 m/s.[12]

5) The Blink Reflex: In patients with partial facial weakness due to unilateral facial nerve lesion, the blink reflex might show the following abnormalities. Stimulation of the trigeminal nerve on the side of the lesion will reveal prolonged latencies & reduced amplitudes for both R1 & ipsilateral R2, but normal latencies & amplitudes for contralateral R2. It was reported that the amplitude of R1 (on the affected side) recorded within the 1st week after the onset of paresis might be a good predictor of prognosis in patients with partial facial weakness due to Bell's palsy.[13] It should be noted that the blink reflex may be done to exclude brain stem lesion in patients with facial weakness. Abnormality in the contralateral R2 may suggest a medullary lesion. In mid-pontine lesion, R1 may be absent or delayed on the affected side, but there will be intact ipsilateral & contralateral R2. In complete facial paralysis, the R1 & ipsilateral R2 would be unobtainable on the affected side, but contralateral R2 will be normal.[14]

6) Electromyography (EMG): Data derived from needle EMG is accurate if it is done 10-21 days after the onset of paralysis (i.e. until axonal degeneration has become complete)[6]. In patients with complete paralysis, especially those with ENoG findings that revealed >90% facial nerve degeneration, needle EMG is recommended.[6,11,15] Needle EMG can reveal signs of denervation (positive sharp waves &/or fibrillation potentials) on rest. The presence of signs of denervation in addition to the absence of voluntary MUAP during EMG examination would indicate poor outcome in patients with >90% degeneration as suggested by ENoG. This might suggest the need for surgical decompression of the facial nerve within the 1st 2 weeks since the onset of paralysis.[15] Also, needle EMG may be done in patients with long standing complete paralysis without improvement (i.e. with delayed recovery) as EMG signs of reinnervation (nascent MUAP), usually appear 6-12 weeks before clinical return of function. If EMG revealed signs for reinnervation this suggest that biofeedback training could be of help in functional restoration. If EMG revealed no signs for reinnervation, it might help in evaluating the facial muscle status i.e. whether there is complete fibrosis of the muscle or there is still viable contractile muscle fibres. This might help in determining the future line of surgical management (muscle graft or nerve anastomosis). It should be noted that fallacies may arise when needle EMG is done for patients with mild denervation (as proved by ENoG) as fibrillation potentials & positive sharp waves can appear in the presence of degeneration of only few nerve fibres. Also, absent voluntary MUAP is expected when the remaining non-degenerated axons have complete neurapraxia. Therefore, it is advised not to do EMG for patients with mild denervation as observed from their ENoG findings.

7) Magnetic stimulation of the facial nerve: Magnetic stimulation of the brain & peripheral nerves is a non-invasive & a relatively painless technique. The CAP can be recorded from the facial muscles using surface recording electrodes (like that used in ENoG) during magnetic stimulation of the facial nerve at the stylomastoid foramen (by 20-mm double coil) or during transcranial magnetic stimulation (TMS) of the brain (by a 90-mm large single coil).[16] In patients with Bell's palsy, the CAP was recordable during TMS only in those patients with mild paralysis.[16] This is possibly because an impulse propagating along the facial nerve will not be able to be transmitted at the site of block in complete neurapraxia. Also, the literature cites some controversy about TMS in predicting the prognosis of facial palsy. [17,18] Therefore, some authors[16,17] concluded that TMS is still inferior to conventional electrical stimulation in assessing facial palsy. Furthermore, magnetic stimulation has some disadvantages such as: stimulus localization is unclear, it can not be used in children or patients with epilepsy and it may cause acoustic trauma. [16,19,20]

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Part II: Principles of Physical and Rehabilitation Medicine in Managing Facial Palsy

Eye protection:

1) Early treatment: Artificial tears, ophthalmic ointment especially before sleep & eyeglasses to protect from light, dust & wind.

2) Long-term treatment: Ophthalmologic consultation is necessary for possible surgical interference if there is failure of spontaneous eye closure e.g. tarsorrhaphy, lateral canthoplasty & gold weight implant to the upper lid.[1,2]

Restoration of the facial function:

The use of corticosteroids (CS) in Bell's palsy has improved the prognosis (complete recovery was found in about 60-70% of the control subjects, but in 90% or more of those who received CS). Furthermore, it was found that the success of CS in improving prognosis depend not only on the appropriate dose (1 mg of prednisone /kg body wt), but also on its early intake. [3] Also, patients treated with acyclovir & prednisone were found to have a statistically significant faster time of recovery and more complete recovery than patients treated with prednisone alone. It was also reported that patients treated with acyclovir & prednisone had one half the incidence of synkinesis & facial contracture compared to patients treated with prednisone alone. [4] (N.B. The new antivirals Famciclovir & valacyclovir have better gastric absorption and less gastric irritation than acyclovir).

The role of physiotherapy and surgery in treating facial palsy may be controversial. Surgical decompression of the facial nerve may be recommended by some within 2-3 weeks following the onset of Bell's palsy, if ENoG revealed > 90% degeneration of the facial nerve fibres. [5] However, many physicians do not recommend early surgical interference in Bell's palsy.[6] Others suggested that surgical decompression of the facial nerve should not be done unless there is 100% degeneration of the facial nerve fibres.[7]

Physiotherapy in the form of local superficial heat, electrical stimulation, massage, exercises &/or short wave diathermy (SWD) may be recommended by some. However, other authors does not recommend physiotherapy (especially electrical stimulation) for Bell's palsy or facial palsy. [6,8,9]

Facial muscle protection from injury may be achieved by the use of porous adhesive tape (adherent to the skin and extending from the angle of the mouth to the tragus) to prevent deviation of the mouth to the healthy side during smiling.

Clinical assessment: (A

Apart from electrodiagnosis, clinical evaluation for both the severity of paralysis and the presence of complication (e.g. synkinesis, hyperkinesis or contracture) is the first step before the start of rehabilitation. The most popular method for assessing the severity of paralysis is the facial nerve grading system according to House & Brackmann. [10] Clinical assessment should also be made repeatedly (approximately every month) after the start of any treatment or rehabilitation program to assess improvement.

Physical management: (B

The author may recommend the use of superficial local heat therapy i.e. hot pack (for 15 min/session) for the facial muscles prior to electrical stimulation, massage or exercises. Heat therapy improves local circulation & lower skin resistance to electrical stimulation, thus the lowest current intensity could be used.

The traditional use of electrical muscle stimulation aims at preserving muscle bulk. It has also a psychological benefit as the patient observes muscle contraction in his face that gives him hope for recovery from facial paralysis.

From the physical medicine point of view, the type of the used current in electrical stimulation should depend on the pathology of the facial nerve. If there is no electrophysiological signs of muscle denervation (i.e. the facial nerve lesion is focal demyelination or neurapraxia), faradic stimulation or electrical stimulation using 0.1- 1 ms duration pulses delivered at a frequency of 1-2 pulses/sec (e.g. TENS) may be given for 50-200 contractions/session, 3 sessions/week until recovery. This protocol depends on the author's personal experience and is supported by the findings of other authors [11,12]

If there is electrophysiological evidence for complete facial nerve degeneration, faradic stimulation will not induce facial muscle contraction. For stimulating denervated muscles, interrupted galvanic stimulation (IG) of 100 ms square pulses may (or may not) be given at a rate of 1 pulse/sec for 30-50 contraction/session. During each session, electrical stimulation should be stopped once muscle fatigue occur (i.e. it is not recommend to increase current intensity once fatigue occurs).

When IG stimulation is used, it is usually given 3 sessions/week for no more than 4 months. The lowest current intensity and only a few number of electric pulses/session are recommended to minimize or prevent complications. The IG stimulation should not be used once contracture or voluntary facial movement start to appear. Once active facial movement is regained (even partial), active exercises for each of the facial muscles should be practiced to enhance functional recovery.

Although many authors does not recommend electrical stimulation for the fear of enhancing contracture, interfering with reinnervation or increasing cost of treatment [6,8,9](the findings of other authors may recommend its use. Electrical stimulation was reported by some to enhance axonal regeneration.[13] Also, the above described protocol of IG stimulation was not observed to increase the incidence of contracture or delay recovery. Therefore, the decision for using electrical stimulation in facial palsy may be left for the opinion of the treating physiatrist, especially because it has been used for many years. [14]

One should notice that some of the performed clinical studies [11,12] on the efficacy of electrical stimulation (TENS) in facial palsy were done in a group of patients with variable degrees of facial muscle denervation.

This makes difficulties in interpreting their results. If TENS induced improvement of function in partial denervation, this improvement could be due to the improvement of function of the remaining innervated facial muscles as TENS will not stimulate denervated muscles because it delivers pulses of <1 ms pulse duration.[15]

In the presence of facial contracture, ultrasound therapy (3MHz, for 5 min/session, 5 sessions/week for 3-6 weeks) may be given for the facial muscles of the lower face or frontalis. It should not be given close to the eyes or over the parotid gland. It is recommended to cover the eyes with cotton & gauze during ultrasound session for further eye protection. Also, local superficial heat with massage and stretching exercises may be used for treating facial muscle contracture.

Biofeedback training for the facial muscles in front of a mirror was reported to prevent synkinesis after facial palsy.[16] EMG biofeedback retraining may be of benefit in treating patients with synkinesis. It has been reported to be an example for the plasticity of the central nervous system to reorganize even in long standing paralysis.[17] EMG biofeedback training can also be used to improve (or enhance) functional recovery and facial symmetry in patients with electromyographic evidence of facial muscle reinnervation.

In the past, it has been suggested by some that SWD could be of benefit in decreasing facial nerve oedema in the early stage of Bell's palsy, and thus has been traditionally used to enhance recovery. However, some may not recommend its use in Bell's palsy as SWD is contraindicated in acute inflammation. Also, the latter view is based on the fact that there is acute inflammation of the facial nerve in the early stage of Bell's palsy [6]; and deep heating may increase facial nerve oedema in the bony facial canal. This may predispose to facial nerve degeneration. Thus, the role of SWD in Bell's palsy may be controversial.

C) Management of facial hyperkinesis:

When surgery is not indicated, local injection with botulinum toxin A seems to be the most appropriate therapy. [18]

D) Rehabilitative Surgical procedures:

1) In traumatic facial injuries: microsurgical reanastomosis or nerve grafting including cross-facial nerve grafting should be done as early as possible.[19]

2) In Bell's palsy: It is better to wait for 12 months for spontaneous return of facial function before any surgical intervention. Nerve substitution is possible in the form of hypoglossal-to-facial nerve crossover.[20]

3) In long standing facial paralysis with muscle fibrosis: regional muscle transfer (temporalis or masseter muscles) or microneurovascular muscle transfer (from gracilis or latissimus dorsi) may be done to restore symmetrical facial movement.[21,22]

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L077

BLINK REFLEX IN THE CLINICAL PRACTICE OF PHYSIATRY

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Electrically elicited blink reflex (BR) offers an objective approach for studying the functional state of facial, trigeminal nerves, their synaptic connections in brain stem as well as the neural setting of the reticular formation. Retrospective analysis of patients records (N 921) from 1984-2003 was carried out to identify the clinical utility of BR in physiatry practice. Bell's palsy accounted for 69.05% of the cases, facial nerve injury 4.5%, polyneuropathy 4.34% and numerous other conditions 14.25%,in addition to normal subjects 7.8%. The mean latency of R1 in normal subjects was 11.7±2.6 msc, amplitude 0.35±-0.24 mV, and generally positive pattern of the wave. The ipsi-lateral latency of RII was 36.04±6.08 msc, amplitude 0.3±0.23 mV. The contro-lateral RII latency was 36.69±6.17 msc and amplitude 0.28±0.23 mV. In Bell's palsy, BR confirms its presence in early suspected conditions, presents objective recovery

prognostic evidences and uncovers old axonal degeneration with or without aberrant regeneration. It still uncovers the degree of nerve injury when direct facial nerve stimulation is practically infeasible.BR parameters in Guillian Barre and diabetic neuropathy without clinically evident facial weakness were comparable to that of normal subjects.In HMSN with no facial weakness such parameters were markedly deviant from normal. In good number of fibromyalgia patients, the increased amplitude of the R1 contributes to the assessment of the underlying arousal state in such condition.In hemispheric stroke subjects,RII tends to be reduced or absent, but with no bearing on motor recovery potential.

L078

ELECTRODIAGNOSIS OF RADICULOPATHIES

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Electrodiagnostic(ED) examinations have been utilized to evaluate patients with radiculopathies since the 1950s. Although they have been performed frequently, a universally accepted role of ED studies in the evaluation of these patients have not been achieved yet. Here, ED techniques that have been used for evaluating radiculopathies will be reviewed. Strengths and limitations of these studies, available information about their sensitivities and specifities, the indications of ED studies and their role in the evaluation of the patients with radiculopathy will also be discussed.

The indications of ED studies

The clinical presentation of patients with radiculopathies varies. Findings consistent with injury to sensory fibers are most common, followed by involvement of both sensory and motor fibers, and purely motor dysfunction least common (Hardy and Plank, 1982). Defining whether root involvement is present and which roots are involved is critical for management of the patients with clinical radiculopathy. Patients with acute radiculopathies frequently have clinical findings consistent with injury to a particular root as well as unilevel disc herniations compatible with the clinical picture. The value and clinical utility of the ED studies have been questioned in the patients with these features. These studies can give useful information about the extent and severity of injury, its duration, and the presence of abnormalities other than that localized to the roots. Nevertheless, the primary goal of electrodiagnostic studies will be to establish whether root injury is present and which roots are involved. In that context, the rationale for ED studies may be equivocal where root injury has been clearly established without such information. On the other hand, certainty as to whether a radiculopathy is present and at what level is often difficult with clinical evaluation in the large group of patients with radiculopathy. The sensory, reflex, and motor changes with a particular radiculopathy may be present to a varying degree and may be variable due to overlapping of the root innervations. If clinical evaluation is often difficult for defining radiculopathies, this is also true for radiographic studies. The studies comparing the clinical and radiographic findings have indicated a certain inherent error in clinical-radiographic correlations. Furthermore, radiographic changes generally considered important for defining radiculopathies occur frequently in asymptomatic individuals. Moreover, similar clinical presentations may occur with infectious, neoplastic, rheumatological, inflammatory diseases and may be caused by diabetes. ED studies would be most useful and justifiable in this group of patients with radiculopathies when there is a discrepancy between clinical and radiographic findings. ED studies for radiculopathy are also justified for documentation of muscle activity if difficult decompressive surgery is expected to establish objective criteria for those patients who might benefit from surgery, since careful selection of patients could improve surgical outcome.

Despite these considerations, the importance of ED studies in the diagnosis of radiculopathies has not received universal acceptance. The indications for some electrodiagnostic studies for evaluating radiculopathies have been questioned considering their low sensitivity values despite their high specifities. The reasons for the low sensitivity are as follows; 1. The very proximal location of the lesion severely compromises the value of nerve conduction studies. 2. Compressive radiculopathies characteristically involve only a proportion of the root fibers. 3.Evaluating motor axonal injury is the basis for the most commonly used electrophysiological test for radiculopathies. In many patients, such axonal loss is never found. In these circumstances, a process of demyelination and even conduction block has been inferred which have no appreciable effect on any of the basic components of the electromyographic studies.

Given the absence of a `gold standard' for defining radiculopathies as well the absence of truely blinded studies, available information does not answer critical questions about the role of electrophysiology in patients with radiculopathies. Despite numerous publications on various neurophysiological techniques, there are strong arguments concerning the value of these techniques by concentrating on their clinical import.

Electrophysiological techniques for the evaluation of radiculopathies

1) Needle electromyographic examination (NEE)

NEE is by far the oldest method used to assess patients with suspected radiculopathy, and remains the most widely accepted method for that purpose. It is claimed to have no false positive results. Reported sensitivities largely vary (from 30% to 95%) depending on the criteria used to define radiculopathy. Lower sensitivities were noted in the studies where the evaluation included patients with symptoms but no signs for a radiculopathy, while higher values were reported if the sensitivities were based on correlations with definite clinical and radiographic evidence for a radiculopathy or findings of root injury at surgery, since these patients would tend to have the most definitive and severe root injury.

The NEE has a number of limitations: 1. It assesses only motor fibers and detects primarily only motor axon loss. Thus clinically useful information from NEE is dependent on injury to motor fibers. 2.The findings of NEE do not identify the cause of radiculopathy 3. The findings may reveal the affected root but not the intervertebral level of the responsible pathology. 4. Several limb muscles and the appropriate paraspinal muscles must be investigated for the study to be adequate. Presence of electrical abnormalities in at least two limb muscles innervated by the involved root, coupled with the absence of such abnormalities in muscles innervated by other roots is the basis for NEE diagnosis of an isolated radiculopathy. Therefore at least two muscles within the myotome must be studied, and muscles both within and outside the suspected myotome must be assessed. NEE changes in a single muscle is never justified for diagnosing a radiculopathy and similarly, at least two muscles within a given myotome must be shown to be normal to exclude the presence of radiculopathy. Whenever NEE abnormalities have been obtained in a myotomal distribution, several other muscles supplied by different roots must also be studied to prove that the lesion is limited to that myotome. Diffuse neurogenic entities such as motor neuron disease may be confused with radiculopathies. Another important point for NEE diagnosis of radiculopathy is that, the affected muscles should be innervated by different peripheral nerves. For example, for diagnosing C7 radiculopathy, an attempt must be made to find similar abnormalities in both C7/radial and median innervated

muscles. Additional ED tests are needed to be able to exclude overlapping NEE abnormalities due to polyneuropathies or focal nerve injuries. NEE of the paraspinal muscles is important in the electrodiagnostic evaluation of radiculopathies since it indicates injury proximal to the plexi. Abnormal spontaneous avtivity in these muscles may be the only electrodiagnostic abnormality in the patients with radiculopathy. However, many electromyographers hesitate to routinely include this in their study due to number of limitations: 1.NEE of the paraspinal muscles can be difficult due to problems with patient relaxation. 2.Abnormal spontaneous activity occurs in the paraspinal muscles of asymptomatic healthy subjects, and the incidence of this may increase with age. 3.The technique may have a low sensitivity for S1 lesions. 4. NEE of paraspinal muscles can also be abnormal in motor neurone disease, diabetes mellitus, inflammatory and toxic myopathies, metastases to the posterior primary rami and paraspinal muscles, and for over 3 years following lumbar surgery. 5. Paraspinal fibrillation potentials may not be identifiable likely due to significant overlap of myotomal innervation and recovery with reinnervation. Thus it seems to be not as valuable in chronic lumbosacral radiculopathy as it is in the acute stage.

For the most common radiculopathies, certain muscles are examined routinely since experience has shown these will most likely be abnormal. Ideally, one should examine as few muscles as possible consistent with establishing a diagnosis to minimize patient discomfort. In the absence of a clear clinical radicular syndrome, an optimal `screening' examination has been recommended of at least 4 limb as well as paraspinal muscles for lumbosacral radiculopathies and 6 limb as well as paraspinal muscles for the cervical region.

Fibrillation potentials are the most sensitive indicator of motor axon loss and demonstrating their presence in a myotomal distribution has been the mainstay for the diagnosis of radiculopathy for over 50 years. Although time lag of appearance of these potentials is said to be 3 weeks following the onset of a static radiculopathy, it may vary depending on the length of the motor nerve segment between the site of injury and the muscle. A long-held notion in the electrodiagnostic literature is that paraspinal muscles tend to show abnormal spontaneous activity early on in a lumbosacral radiculopathy, and that more distal muscles become abnormal later in the disease process; disappearance of the potentials is also in a proximodistal direction. However, recent prospective studies have demonstrated no evidence of correlation between spontaneous activity in both paraspinal and limb muscles and symptom duration and emphasized the limitations of using symptom duration when interpreting electrodiagnostic findings in lumbosacral radiculopathy.

Other types of abnormal spontaneous activity can be present in radiculopathies. If fasciculations were to occur in a myotomal distribution, then the finding would be helpful for defining a root lesion. This rarely occurs. Furthermore, fasciculations are common in normal individuals and may be particularly prominent in calf muscles. As such, fasciculations in calf muscles by themselves cannot be used as an indicator of an S1 radiculopathy. Complex repetitive discharges are polyphasic action potentials with an abrupt onset and cessation. They are uncommon in radiculopathies but when present indicate a chronic process.

With neurogenic injury including radiculopathies, there are changes in motor unit firing. Given the overlapping muscle innervation and varying degrees of axonal injury even within the distribution of a single root, rarely are enough motor axons injured in a particular muscle to produce a discernible alteration in recruitment and even rarer is this in a definable myotomal distribution.

With chronic neurogenic injury and reinnervation, motor units increase in size and duration. Some reports have argued that increase in polyphasic potentials can be a clinically valuable approach for the evaluation of radiculopathies and indeed may be the only electrodiagnostic abnormality in these patients. This is not generally accepted. Increase in motor unit amplitude in a myotomal distribution can be helpful in establishing a radicular process as well as its chronicity. The value of any change in motor unit configuration in the evaluation of radiculopathies is also limited by the multiple root innervations of individual muscles and varying degrees of injury to individual nerve fibers.

2) Nerve conduction studies(NCS)

The sensory NCS rarely are altered by radiculopathies, because only preganglionic sensory fibers are injured. Normal sensory nerve action potentials are considered strong evidence for a radiculopathy versus more distal (plexus or nerve) injury.

Root lesions causing axon loss may affect the CMAP amplitude, depending on the amount of degenerated muscle fibers. However, CMAP amplitude is usually unaltered, due to overlapping root innervation and incomplete nature of the root injury. Since the nerve segments being assessed are distal to the lesion site, motor nerve conduction velocities remain normal or may be mildly slowed owing to loss of the fastest conducting fibers.

Whatever the specific effect of radiculopathies on motor and sensory fibers, motor and sensory conduction studies are an essential part of the electrodiagnostic evaluation of radiculopathies. Mononeuropathies, poylneuropathies, and plexopathies may all need to be excluded before an electrodiagnostic diagnosis of a radiculopathy can be made.

3) *Late Responses*

H reflexes abnormalities are generally accepted to have a high predictive value in S1 radiculopathies. Asymmetrical prolongation as well as asymmetrical amplitude decrease of H reflexes can be present with S1 root injury. H reflexes can also be recorded from the flexor carpi radialis muscle(FCR). Asymmetrically absent H reflexes or FCR H reflexes of prolonged latency have been found in those with C6 or C7 root injury. H reflex studies are the only procedure that evaluates preganglionic sensory fibers. They have the advantage of monitoring conduction in not only efferent fibers but also afferent fibers. At the same time, H reflexes can be affected by any proximal nerve injury, and abnormal H reflexes do not necessarily indicate a radiculopathy. Bilaterally unelicitable H responses must be interpreted with caution in normal subjects over age 60 years and in any patient who has previously undergone a lumbar laminectomy.

F wave studies are useful in the assessment of proximal neurogenic lesions. A number of F wave parameters have been evaluated in patients with radiculopathies. Minimal latency in a series of F waves are the most commonly recorded F wave parameter. Mean latency values, however, have been found preferable to minimal values because of increased reproducibility and sensitivity. Given the difficulties at times in defining absolute F latency prolongation with certainty, meaningful differences between sides are often more important in patients with radiculopathies than absolute latencies. Based on prolonged latencies or abnormal side-to-side differences, sensitivities of about 50–80% have been reported for F waves in the evaluation of lumbosacral radiculopathies. Sensitivities were particularly high for S1 radiculopathies. Subsequently, the value of F waves in the evaluation of radiculopathies has been questioned. F waves measure activity in motor fibers, and therefore F wave abnormalities may overlap with findings on the NEE. F waves have been considered less sensitive than the NEE in radiculopathies in the studies that used only minimal latency values. Due to the multiple root innervation of muscles, normal latencies might occur even when an individual root may be injured.

The difference between the shortest and longest F latencies in a series of F waves (chronodispersion) reflects the range of conduction velocities in the motor axons in that series of F waves. F wave chronodispersion could provide a measure of the range of conductions in an injured root. Recently a new F wave parameter has been introduced. Evaluating the difference in F wave duration between the affected and unaffected sides has been demonstrated to be clinically useful to detect S1 radiculopathy, especially in patients

in whom Fmin remains normal. Current reports using F wave parameters other than minimal latencies support the idea that F waves may have a sensitivity comparable to NEE. However, F waves by themselves cannot be used as evidence for a radiculopathy since any proximal nerve injury may disturb F waves.

4) *Somatosensory evoked potentials (SEP)*

The use of somatosensory evoked potentials (SEPs) in the evaluation of radiculopathies is controversial. SEPs have the theoretical advantage of evaluating afferent fibers. Studies of radiculopathies using SEPs have involved stimulating either mixed or cutaneous nerves or skin dermatomes. Abnormality may be based on the absence of responses as well as prolonged latencies and decreased response amplitudes. However, there are number of limitations. There is agreement that mixed nerve SEPs have little value in the evaluation of isolated root lesions, due to multiple root innervation of the nerves stimulated. Cutaneous nerve stimulation has been used with a view to increase the sensitivity of SEPs. However, as the root innervation of the cutaneous nerves may not be specific, segmental SEPs may be less sensitive in those with single level root injury in comparison to those where the injury may involve more than one root level. Lumbosacral radiculopathies have also been evaluated using dermatomal SEPs. Although appropriate and meaningful abnormalities have been reported in the majority of patients with surgically confirmed L5, S1 root lesions, many of these patients had radiographic findings that could be consistent with spinal stenosis. Recent studies have questioned the ultimate diagnostic utility of dermatomal SEPs in radiculopathies. Based on available evidence, SEPs in radiculopathies have been considered `investigational' for radiculopathy but useful in chronic, multilevel multiple rootlet disease such as spinal stenosis.

5) Root Stimulation

In this technique, cervical and lumbosacral roots are stimulated by means of monopolar needles at the vertebral lamina directly lateral to the spinous processes, and evoked responses are recorded with surface electrodes from the muscles representative of various myotomes. A radiculopathy is indicated based on minimal latency and amplitude asymmetries. Although some authors reported electrical root stimulation to be superior to routine EMG in localising unilateral or multiple lumbosacral root involvement, there have, however, been dissenting views arguing that activation may occur at the level of mixed spinal nerve, rather than within the intraspinal canal.

Because percutaneous electrical stimulation causes painful contractions of the paraspinal and girdle muscles, it is rarely used since the introduction of magnetic stimulation that does not produce high current densities in adjacent tissues and therefore produces little activation of pain fibers. With magnetic stimulation, recording from several muscles in a limb innervated by different roots and noting focal abnormalities may evaluate the specific root injured. Prolonged latencies following magnetic stimulation have been reported with both lumbosacral and cervical radiculopathies. Further work using either electrical stimulation with needles or magnetic stimulation of roots seems warranted.

6) Dynamic Studies

The demonstration of meaningful electrophysiological changes that occur with maneuvers that reproduce the patient's symptoms may be a rewarding approach to the electrophysiological evaluation of patients with radiculopathies.

L079

PATHOPHYSIOLOGıCAL MECHANISMS IN NEUROPATHIC PAIN A REAPPRAISAL

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Pain that accompanies a lesion of the peripheral or central nervous system and projects to the innervation area of the dysfunctional nerve or pathway is defined as neuropathic pain (1).İt is intense, persistant and has complex overlapping and interactive pathophysiological mechanisms which are characterized by paroxsysmal pain, allodynia and hyperalgesia (2,3). Neuropathic pain syndromes represent heterogenous conditions that can neither be explained by one single etiology nor by a special anatomic lesion (2) and correlation between mechanisms and clinical symptoms is not easy since patients with a definite diagnosis may present with various pathophysiologial mechanisms as well as such mechanisms may be found in different clinical syndromes and one mechanism may change to others in a single patient over time or may be respon sible for several different painful symptoms such as spontaneous or evoked pain (4,5).The main symptoms common to all neuropathic pain patients are the positive and negative phenomena which depend on the system affected,both of which may be found in a single patient and involve the motor,sensory and autonomic systems (5).

Special features of neuropathic pain: Neuropathic pain,unlike nociceptive pain which is an alarm system aiming to protect the organism against noxious stimuli, occurs in areas of sensory loss and is a symptom of neurologic dysfunction. Despite various etiologies it presents clinical features like sponta neous pain usually of burning character, paroxsysmal or evoked pain to thermal or mechanical stimuli such as allodynia, hyperalgesia,unpleasant sensations like dysesthesia and all of these symptoms are the result of central changes in the neurons still connected to the periphery (6,7). The cardinal feature of neuropat hic pain,as seen from the above statements,is the occurence of the cited phenomena in areas where afferent transmission is lost presenting with sensory deficit (7,8).

Difficulties in diagnosis and treatment of neuropathic pain: Lack of a direct relation between symptoms and pathophysiologic mechanisms, variability of symptoms and their tendency to change over time,difficulties in the objective measurement and assessment of symptoms and animal experimental studies and their applicability to human pathophysiologic findings are the main obstacles in both the diagnosis,prognosis and treatment of these syndromes (7,8).

Peripheral mechanisms in neuropathic pain: Functional alterations in primary afferent nociceptors are the most important mechanisms.

-Abnormal spontaneous activity at ectopic sites

-Nociceptor sensitization

-Abnormal interactions between fibers

-Hypersensitivity to catecholamines have been identified for the generation of abnormal primary afferent activity.The first factor is related to the dysregulation of the synthesis and redistribution of the sodium channels that control membrane excitability and the tetrodotoxin-resistant channels (TTX-resistant) found only on nociceptor sensory neurons have been demonstrated at injury sites of ectopic impulse generation,the accumulation of which decreases action potential threshold (7).The question whether a specific sodium channel is responsible still remains unanswered and recent research indicates that secondary or higher order neurons may also display such dysregulation and that specific types of sodium channels within higher order neurons can also contribute to pain-related signalling (9).After a damage to the peripheral nerve,regenerating sprouts of damaged axons of both the unmyelinated and myelinated fibers develop abnormal spontaneous activity and increased sensitivity to mechanical,chemical and thermal stimuli.NGF affects sodium channel expression in DRG neurons and glial-derived nerve factor (GDNF) modulates TTX-resistant channel expression on DRG neurons maintaining normal levels as to reduce hyperexcitability (9).Animal studies have shown that nerve injury induced ectopic activity diminishes within a few days after injury yet behavioral signs of neuropathic pain persist which

points to the fact that ectopic activity is not sufficient to explain the persistance of neuropathic pain.The second mechanism of nociceptor sensitization has been demonstrated in experimental nerve injury models in rats (2) where there is abnormal discharge to suprathreshold stimulation in the absence of acute tissue injury or inflammation.Nociceptor sensitization is characterized by an ongoing discharge mostly from C nociceptors which are normally silent in the absence of noxious stimulation (8).The third mechanism relates to abnormal connections between individual afferents under pathologic conditions and these are ephaphes with ephaptic interaction and crossed after-discharges where synchronous activity in primary afferents causes autonomous firing in neighbors (10,11).İn contrast with ephaptic interaction crossed after-discharges develop early after nerve injury,do not depend on structural alterations involving a large propotion of afferents and dorsal root ganglia (10,11).Both of these mechanisms may participate in allodynia (7). Hypersensitivity to cathecolamines shows the role of the sympathetic nervous system in this syndrome. After partial or complete nerve injury the regenerating sprouts at the lesion site and at the DR ganglia show an excitatory response to norepinephephrine due to abnormal expression of adrenoreceptors which induces coupling between the sympathetic efferents and sensory afferents as well as the sprouting of the sympathetic fibers in the DRG with basket-like structures around large primary afferent stomata without synaptic contact which may be triggered by NGF.Sympathetic-sensory coupling has been demonstrated in CRPS2 and in post-traumatic neuralgia (12,13,14). The concept of sympathetically maintained pain (SMP) based on positive response to sympatholytics has controversies because not all patients with CRPS benefit from these procedures and data from animal models are inconsistent with human SMP observations which may be due to factors like stimulation frequency of sympathetic neurons and the concentrations of applied adrenoreceptor agonists (13,15).

Central mechanisms in neuropathic pain: İrradiation of pain, long duration after a mild stimulus, temporal and spatial summation of pain and anesthesia dolorosa are symptoms that cannot be explained by peripheral mechanisms and data from experimental studies indicate that at least three types of central modifications can induce pathologic activation of central neurons and these are central sensitization,central disinhibition and anatomic reorganization (4).Central sensitization is due to increased C fiber activity that elicits increased out-put of excitatory aminoacids that activate NMDA receptors located on the membrane of spinal dorsal horn neurons (4).Central disinhibition is due to dysfunction of the segmental and supraspinal modulatory control systems. Seg mental dysfunction and disinhibition of the pain control at the dorsal horn level has been demostrated by electrophysiologic studies after peripheral nerve injury. Decreased levels of GABA and glycine which act as inhibitory neurotransmitters and downregulation of GABA receptors have been reported at the spinal cord dorsal horn level and these interneurons can be destroyed through excitoxic mechanisms triggered by excessive stimulation of NMDA receptors (4).Supraspinal disinhibition is due to discharge of large myelinated fibers that mediate some aspects of neuropathic pain and afferent input through these may reach supraspinal sites since they project directly to the brain stem via dorsal column neurons and the post-synaptic neurons that project to nucleus gracilis. İnput to this site activates descending facilitatory pathways through the rostroventral medulla (RVM) by activating the (on) cells located there.The activation of the (on) cells is the source of descending facilitation and their dis charge results in chronic abnormal pain (16).Anatomic reorganization is the end point of intensive damage to primary afferents.Animal experiments have shown that following peripheral nerve sections the large myelinated fibers conveying non-noxious messages and terminating laminae III-IV may grow into lamina II and make synaptic contact with the second order neurons located there.These data provide support for allodynia after a nerve lesion as well as the findings in a group of PHN cases in whom A beta mediated dynamic mechanical alodynia is present in areas of maximal pain with massive loss of C fiber sensory function. Besides extensive damage to C fibers growth factors, neurotrophins and neuropeptides released by the injued C fibers play a role in the growing of A beta fibers into the nociceptive laminae (17).Central sensitization and opening up the existing but silent synaptic connections between large myelinated afferents and nociceptive specific neurons in the spinal cord and sensitization of the WDR neurons are two additional mechanisms that may explain dynamic mechanical allodynia.

The role of the immune system in neuropathy and neuropathic pain: Half of the clinical cases of neuropathic pain are associated with infection or inflammation rather than trauma (18) and animal models have demonstrated immune activation at the site of inflammation, around nerve trunks, DRG and dorsal roots all of which is hyperalgesic.The immune cells when activated, pro duce proinflammatory cytokines like TNF, IL1 Beta which may directly sensitize afferent neurons and IL1 Beta hyperalgesia is mediated through increase or NGF in the inflamed nerve (3).Such activation can also take place at the spinal cord level and occurs in the form of glial activation and glia are powerful modulators of spinal pain transmission (18). İmmune activation can contribute to neuropathic pain via antibody attack on peripheral nerves. IgM, IgG1, and IgG3 antibodies activate the complement cascade which distrupts the blood-nerve barrier and binds them to cell membranes. This binding alters ion-channel function and distrupts Schwann cell function thus releasing proinflammatory cytokines which further alter the barrier and damage the myelin (18).Antibodies may also act through molecular mimicry where they attack epitope-like regions on the surface of normal nerves.Antibodies to peripheral nerves can also arise after nerve trauma which exposes nerve proteins PO and P2 normally within the myelin sheath and these proteins,when exposed, generate an immune response. Antibody attack on peripheral nerves can occur against pathogens invading the nerve and this attack may affect the blood vessels supplying the nerve, resulting in vasculitis, occlusion of the vessels, distruption of the blood-nerve barrier, nerve ischemia and induction of neuropathic pain.

Animal and human studies showing evidence for the role of imune mechanisms in the induction and maintanence of neuropathic pain:

-İncreased cytokine expression in human chronic inflammatory demyelinating neuropathy

-Vascular changes, demyelination and axonal degeneration following TNF injection into the sciatic nerve in animals

-A correlation of the intensity of pain and high serum levels of IL6 in patients with post-diskectomy pain

-Allodynia, demyelinating neuropathy and dysesthesia after IV monoclonal antibodies directed against nerve ganglioside (GD2) in the rat model and in humans.

The mechanisms of pain due to peripheral nerve injury and inflammation has been subject to intensive research in the recent years. Yet we are not near to application of data obtained from animal studies to human subjects.The studies based on animal data have pointed to high variability of neuropathic pain states and have shown that nociceptive behaviors in animals are variable according to species and strains (19,20).The animals may also have different levels of spinal excitability (19).As a result, animal studies on experimentally induced neuropathic pain are still far from demonstrating the special features of this synd rome like mechanical allodynia, dysesthesia and hyperalgesia since what the animals present is only pain behavior.

Conclusion

-İn humans symptoms alone are not sufficient tools to define treatment strategies or to diagnose specific cases of neuropathic pain.

-İnterpretation of data obtained from animal studies to humans still has some defects.

-Studies on the effect of drugs on various clinical phenomena of neuropathic pain cannot yet disclose the the mechanisms responsible since they are not usually revealed on a clinical level.
-A symptomatic approach to the analysis of various components of pain and deficits is important for the assessment and treatment as well as to retain organ- based diagnostic work-up and symptomatic analysis should be performed by quantitative sensory testing.

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L080

THE PAIN CLINIC MANAGEMENT OF LOW BACK PAIN

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The talk will start by emphasising the multidisciplinary approach to low back pain taken in the pain clinic.
A working classification of low back pain will be presented.
The following conditions will be covered with special reference to interventional procedures which can be carried out in the pain clinic.

1. Lumbar & Lumbosacral Facet Joint Pain
2. Discogenic Pain
3. Sacroiliac Joint Pain
4. Vertebral Collapse
5. Nerve Root Pain
6. The Piriformis Syndrome
7. Coccycodynia
8. Myofascial Pain

The importance of the sympathetic nervous system in chronic low back pain will be discussed
The Failed Back Surgery Syndrome will be described
To conclude, general clinical options available in low back pain will be reviewed, viz.

a. pharmacological options
b. physical options
c. psychological options
d. stimulation therapy (TENS, Spinal Cord Stimulation,)

LO81

ADVANCES IN PAIN MANAGEMENT AND REHABILITATION

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Recent advances in neurosciences allow a better understanding of the underlying mechanisms involved in pain generation and perpetuation. Prolonged activation of nociceptors induces neuroplastic changes in the peripheral and in the central nervous systems. Spinal Segmental Sensitization (SSS) is a hyperactive state of the spinal cord caused by bombardment of nociceptive impulses sent from a sensitized damaged tissue to dorsal horn neurons (central nervous system sensitization).The clinical manifestation of dorsal horn sensitization includes hyperalgesia of the dermatome, pressure pain sensitivity of the sclerotome and myofascial trigger points within the myotomes, which are supplied by the sensitized spinal segment. The state of facilitation spreads from the sensory component of the spinal segment to the anterior horn cells that control the myotome and also to the sympathetic centers located in the involved spinal level.
The importance of SSS is emphasized by the fact that it is consistently associated with pain. For example, thoracic SSS facilitates and perpetuates abdominal pain and somatovisceral symptoms commonly mimicking gastrointestinal disorders. Failure to recognize and diagnose SSS often leads to only temporary deactivation of MTrPs, since physical therapy and trigger point injection procedures are aimed at treating the peripheral MTrPs

without addressing the segmental dysfunction. This may lead to transient benefit rather than long-term relief because MTrPs and their associated symptoms frequently recur.

Diagnosis of Sensitized Spinal Segment (SSS):

Dermatomal Hyperalgesia:

1.Paper clip scratch test (use of sensory diagnostic tracks)

2.Pinch and roll: Test sensitization of subcutaneous tissue

3.Electric skin resistance: Objective quantitative testing

Diagnosis of dorsal and ventral primary ramus hyperalgesia

Sclerotomal Hyperalgesia:

Palpation for tenderness of supraspinous/interspinous ligaments at the involved spinal segments

Palpation for tender and edema at attachments of taut bands to bones (enthesopathy)

Bursitis, tendonitis, epicondylitis, pericapsulitis, periostitis

Myotomal distribution of:

1.Trigger points/tender spots by palpation and algometry

2.Taut bands by palpation and tissue compliance meter, which renders quantified, objective results

Muscle spasm/reduced stretch range by palpation

Sympathetic hyperactivity:

1.Microedema

2.Decreased electric skin resistance

3."Orange peal skin"

The improved examination techniques have greater sensitivity and are much faster than the conventional methods. It provides precise diagnosis of the dysfunctional territory with quantitative and objective assessment data.

MANAGEMENT AND REHABILITATION

In the presence of the clinical findings of SSS, management should always concentrate on the sensitized spinal segment corresponding to the immediate cause(s) of pain (TrPs/TSs, MSp, inflammation) and the associated supraspinous/interspinous ligament nociceptive irritative focus (TrPs).

New injection techniques employable in physiatric office can relief neuromusculoskeletal pain by reversing SSS to normal sensitivity. The objective of these injection techniques are to desensitize the dorsal horn, to eliminate the SSS and eradicate the peripheral pain generators, preventing painful afferent bombardment of the dorsal horn of the spinal cord. Paraspinous blocks desensitize the SSS.It consists of spreading local anesthetic (1% Lidocaine) in the groove between the spinous process and the spinalis muscle at the spinal level of the SSS with a 25-27gauge 1.5 inch needle. Preinjection blocks (PIB) anesthetize the painful sensitive area to be infiltrated.It consists of spreading local anesthetics along the nontender normal tissue surrounding the taut band with a 25-27gauge needle; length depends on the depth of the taut band. PIB relieves the neurogenic component of the taut band and prevents pain and further central sensitization caused by needling or infiltration of a sensitized area.

Needling & infiltration of the taut band (TB) breaks up the entire underlying pathology of the TRPs/TSs.

Post injection physical therapy modalities such as superficial heat or cold and electric stimulation (sinusoid surging and tetanizing currents) associated with relaxation by activation of the antagonists and stretching exercises is performed for three consecutive days. Specific postural correction exercises are also addressed.

Long-term outcomes can be achieved by removal of perpetuating and etiological factors. Mechanical overload of body parts, cumulative trauma disorders, deficiency of muscle function and postural deficiencies are main causes of neuromusculoskeletal pain perpetuation. Endocrine disorders, particularly, low thyroid or estrogen supply to the muscles, metabolic or electrolyte disorders and vitamin deficiencies may also perpetuate pain. Symptomatic pain relief can also be achieved with medications, and should be used in chronic pain patients.

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L082

THE USE OF NEUROPHYSIOLOGIC ASSESSMENT IN REHABILITATION THERAPY

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Physiological assessments are used in rehabilitation medicine for monitoring the course of recovery processes involving biological processes of reorganization in both intact and damaged organs. These procedures can be used to understand more about the nature of such recovery processes, to establish diagnosis and to predict outcome, and also as treatment tools in different modes of therapy. Recording data about the nervous system functioning with neuro-diagnostic tools provides objective and quantitative information all along the recovery process.

Damage and recovery processes can involve the peripheral, autonomous and central nervous system (including the sensory, motor and endocrine modalities). The ability to restore maximal functional activity depends on biological, psychosocial and environmental factors. It is of note that recovery processes may have "side effects", thus inflecting additional damage. In summary, the significance of neurophysiologic recovery of CNS is the activation of alternative pathways; these in turn need to be evaluated by neurophysiologic tools.

Several distinct tests are included in the field of electro/ physiological-diagnosis, using electrical technology for the study of human neurophysiology. These Neuro-diagnostics tests include techniques such as Electromyography (EMG), and Evoked Potentials (EP).

Some of these tests bypass the brain by discharging an electrical and/or a physical stimulation to the patient. Such functional assessments rely on the measurement of several parameters of the body's responses to a signal. We distinct between those procedures that rely on intrinsic/self-pacing activity, and those based on artificial external stimulation. The goals of these assessments are to localize the injury and to quantify its significance, to test the specificity of the diagnosis and to evaluate the prognostic potential.

It is a hard mission to define the "normal physiologic function". We will present these assessment procedures with their rationale, and then illustrate their use with clinical cases.

L083
ASSESSMENT OF SPASTICITY USING SURFACE ELECTROMYOGRAPHY

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Introduction

In disorders of the central nervous system, motor control often is seriously affected in many aspects, resulting in inadequate execution of movements and consequently a decrease of skills affecting quality of life. The changes in motor control are often described in terms of paresis and spasticity. Whereas paresis is a relatively well defined aspect of motor control which can be assessed by assessing the loss of maximum force, spasticity is a much more complex phenomenon. In literature, many different definitions of spasticity can be found of which the most accepted one is that from Lance (Lance 1980). He defined spasticity as:

'A motor disorder that is characterized by a velocity dependent increase in the tonic stretch reflex with exaggerated tendon reflexes, resulting from hyper-excitability of the stretch reflex, as one component of the upper motor neuron syndrome'

The advantage of this definition is that it is quite clear, but the disadvantage is that it only includes the tonic stretch reflex. In the European project Spasm, recently an extensive review has been carried out on the many methods that have been and are used to assess spasticity, to identify best practice and to develop recommendations. As a thematic network, the aim of SPASM is to foster European collaboration to facilitate future research into the understanding and measurement of spasticity (see www.spasmproject.org). The consortium considered the Lance definition as too narrow and agreed on a new wider definition: 'Assuming that all involuntary activity involves reflexes, then spasticity is intermittent or sustained involuntary hyperactivity of the skeletal muscle associated with an UMN lesion'

In the review, the assessment of spasticity was approached from three different angles: neurophysiological, biomechanical and clinical approach. In this paper/presentation some aspects of the neurophysiological approach will be discussed.

Surface EMG methodology

Although there are many different approaches, a common element is that the response of the muscle upon specific stimuli is recorded using bipolar electrodes placed on the muscle. The observed muscle activity strongly depends on the placement of the electrodes on the muscle. In the European Seniam project extensive discussions have been taken place and have resulted in recommendations for both the electrodes to be used as well as where to place them on the muscles. Some relevant conclusions are:

- Electrodes should never be placed near the innervation zone or the tendon as then a small shift of the electrodes will result in a large decrease of the amplitude of the EMG signal. Unfortunately the innervation zone often corresponds with the most bulky part of the muscle
- The inter-electrode distance strongly effects the EMG signal and for the large muscles an inter electrode distance of 20 mm is recommended
- For a number of muscles specific electrode placement have been developed

See the Seniam website for more information: www.seniam.org

Assessment of spasticity

The neurophysiological approach involves the use of muscle activation responses in various conditions, assessed by surface electrodes placed on the skin. These include:

- Reflexes upon electrical stimulation like the H reflex, the H/M ratio, or mechanical stimulation like the tendon reflex
- Muscle responses upon passive movements, like manually supported passive movements or machine driven and the pendulum test.
- Muscle activation patterns during active movements like in gait or other more restricted cyclic movements

The review shows that the methodology of reflexes is well developed but also that the results are strongly influenced by many characteristics of the experimental set-up. Although it is relatively clear which aspects are assessed by the reflex measurements, the correlation with clinical measures is low.

The measures derived from passive and active movements are considerably less developed from a methodological point of view and are often more laboratory based but they seem to be much more related to clinical measures and phenomena. The pendulum test, in which the lower leg is raised and then released, seems a promising method when the EMG is measured together with the assessment of the movements. However, to be clinically useful, this does require that new EMG analysis techniques are developed to detect the muscle activation patterns automatically in terms of bursts and continuous activity. The availability of such techniques would also strongly facilitate the assessment of spasticity during active movements. It is likely that this provides better correlations with clinical measures and phenomena.

L084
ELECTROPHYSIOLOGIC REFLEX STUDIES

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Electrophysiologic reflex studies are electrophysiologic techniques that assess the reflexes which some of those can not be assessed clinically. These studies provide information about the entire course of the peripheral nerve and they are especially valuable in testing the proximal nerve segments which are not easy to assess with conventional nerve conduction tests. In addition, as the reflex arc has a central component, reflex tests provide information about the excitability of the neuronal pool. Electrophysiologic reflex studies mainly include H reflex, F wave, T (tendon) reflex, Masseter reflex, Tonic Vibration reflex, Blink reflex, and Bulbocavernosus reflex.

The H reflex is one of the most extensively studied reflex in the literature in assessing experimental and clinical aspects of disorders of the central and peripheral nervous system. The H reflex is an electrically activated monosynaptic reflex. It usually evoked with submaximal stimulation of tibial nerve from gastrocnemius-soleus muscle but it can be elicited from the flexor carpi radialis and the quadriceps muscle without any facilitation in most cases. In some other muscles H reflex can also be obtained but usually requires some facilitation techniques. The H reflex can be a useful adjunct to routine nerve conduction studies in assessing peripheral nerve disorders and central motor neuron excitability. It commonly is used in assessing S 1, C 6-7 and L 3-4 radiculopathies and peripheral neuropathies.

F wave (or F response) is a small, late response which is originated by antidromic activation of motor neurons and is not a true reflex. F waves are generated whenever the motor fibers of a peripheral nerve are stimulated supramaximally but they usually recorded from intrinsic hand and foot muscles in routine studies. It is an important

part of the routine nerve conduction studies in most of the ENMG laboratuaries. F wave studies assess the entire motor axon therefore may be useful in the assessment of very proximal neurogenic lesions such as radiculopathies, plexopathies and proximal peripheral neuropathies.

T (tendon) reflex is electrophysiologically elicited muscle stretch reflex with an electronic reflex hammer. It has the same pathway with H reflex with some distinctions. The most important difference is the activation site of stimulation. For the T reflex the stretch receptors in the muscle spindle are activited after tapping the tendon whereas for the H reflex stimulation is directly on the Ia fibers bypassing the muscle spindle organs. The T reflex is useful in detecting radiculopathy or peripheral neuropathy as a test for proximal conduction. Masseter reflex, or the jaw jerk, is a monosynaptic muscle stretch reflex evoked by an electronic hammer tap on the jaw, thus it is a kind of T reflex. It is useful in the diagnosis of the disorders of midbrain and pons. Tonic vibration reflex (TVR), which is the tonic contraction of the muscle after applying a vibratory stimulus to the tendon or muscle, can be recorded and may be useful in assessing motor disorders.

Bulbocavernous reflex can be recorded electrophysiologically and can be valuable in testing sacral 2-4 spinal segments and pudental nerves in pathologic conditions such as neurogenic bladder, impotance or fecal incontinence. Cremasteric reflex can be recorded and may be very useful in the diagnosis of genitofemoral neuralgia. Babinski reflex and reflex like abnormal motor phenomena such as clonus can also be studied electrophysiologically.

L085

COMPLEMENTARY AND ALTERNATIVE MEDICINE IN RHEUMATIC DISEASES

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There is an increasing interest in the variety of treatments considered as complementary and alternative medicine (CAM). Medicine doctors often encourage patients to take an active role in their self-care. The approach to self-care may include CAM. The doctors need to understand CAM and help patients become educated consumers in order to enhance their health and quality of life.In USA; National Center for Complementary and Alternative Medicine (NCCAM) is a part of the National Institutes of Health, established in 1998. Complementary medicine is used together with conventional medicine. Alternative medicine is used in place of conventional medicine. Integrative medicine combines mainstream medical therapies and CAM therapies for which there is some high-quality scientific evidence of safety and effectiveness. In a 1997 patients with rheumatic diseases, more than 60% indicated that they had used some type of alternative care. The main categorization of CAM : 1-Alternative medical systems such as acupuncture and homeopathic medicine, mind-body interventions, 2-Biologically based therapies that include herbal remedies, manipulative and body-based methods, and 3-Energy therapies.

Cochane;In 1996, to meet the need for high quality information in complementary medicine, the Complementary Medicine (CM) Field was established to help promote and facilitate the production of systematic reviews in topics such as **acupuncture, massage, chiropractic, herbal medicine, homeopathy and mind-body therapy.**

The first very imporatant article describing the work of the CM Field, as well as challenges and issues,was published in the November 11, 1998 edition of JAMA.

Terminology

Allopathic medicine is a medical practice called Western medicine, scientific medicine, or modern medicine.

Complementary/Alternative medicine

The terms “complementary medicine” and “alternative medicine” are used inter-changeably with “traditional medicine” in some countries. Complementary/alternative medicine often refers to traditional medicine that is practised in a country but is not part of the country’s own traditions. They are sometimes used to refer to health care that is considered supplementary to allopathic medicine. any patients is a complementary/alternative practitioner.

WHO defination;a- Medication therapies: Herbal medicine, **b-Non-medication therapies**: Acupuncture,manual therapies, qigong, tai ji, thermal therapy, yoga and other therapies such as mind –body therapy.

Countries and CAM

Canada

In general, the use of complementary/alternative health care in Canada is higher at younger ages, among women, among people with higher formal education and higher incomes, and in the West, it seems likely that Canada will soon give formal recognition to more complementary/alternative practitioners.

The patients consult complementary/alternative practitioners for the problems of the musculoskeletal system and connective tissue. There is no standardized complementary/alternative component in CAM, most medical schools offer some form of training in complementary/alternative medicine to their students but just a few lectures.

United States of America

The public and professional interest in CAM is increasing. Commonly used therapies are relaxation techniques, herbal medicines, massage, chiropractic, spiritual healing by others, megavitamins, self-help groups, imagery, commercial diets, folk remedies, lifestyle diets, energy healing, homeopathy, hypnosis, biofeedback.

Europa,Vienna

Austria has one academy of holistic medicine. Public insurance doesw not cover CAM. Exceptions are made, however, for homeopathy and, for purposes of pain relief, massage, balneotherapy, and electrotherapy.

Belgium

Complementary/alternative medicine is not taught in Belgian medical schools.The Belgian social security system does not officially pay complementary/alternative treatments

Turkey

Social security system does not finance CAM. There is not a standart university education for CAM. In Uludağ University School of Medicine, there is an elective course for 14 hours on CAM which is mostly on a theorical basis. However the number of student that attend the course is significantly higher than the regular elective courses. The main titles of the lectures are; Introduction to CAM and Rheumatic Diseases(RD), Defination of CAM and classifications, Acupuncture and acupoint-stimulations, Herbal Therapy, Diet and Dietary supplemants, Manual therapy and Massage, Energie treatments (Reiki, Qigong, Taiji), Yoga, Topical agents in rheumatic deseases, Education, Behavior treatments in RD, Balneotherapy as a CAM, Evidence based aprroach to CAM.

Basic Topics on CAM

Acupuncture

A CAM modality, is increasing popularity among RD patients, especially those who have failed to respond to the main therapy. Approximately one million consumers use acupuncture annually in the United States and that a large percentage of these users are patients with musculoskeletal disorders.

The mechanisms of action for acupuncture analgesia have been proposed. The most known hypothesis is the neurohumoral model of acupuncture analgesia. This model proposes that the acupuncture needle stimulates the A delta afferents (types II and III) of a peripheral neuron. This neuron, terminating in the dorsal horn of the spinal cord, transfers the impulse to a second neuron within the same spinal

segment. This second neuron then activates three levels of the nervous system. These levels are: 1) the spinal cord itself, within the same segment, 2) the midbrain, where two of the three anatomical structures of the body's internal analgesia mechanism: The periaqueductal gray matter (PAGM) and raphe magnus nucleus (RMN), and 3) the pituitary-hypothalamus complex.

As each of these three levels are stimulated, specific endorphins and monomines (serotonin and noradrenalin) inhibit pain. Additionally, low frequency (2-4Hz) electro- acupuncture is believed to stimulate the release of ACTH, stimulating the adrenal cortex and the release of cortisol, producing anti-inflammatory effects. *It can be used a pain relieving agent in the rheumatic deseases.*

Homeopathy

Homeopathy is based on two main principles. The first is the principle of "similars," which states that patients with a particular pattern of signs and symptoms can be cured if they are given a drug that produces the same pattern of signs and symptoms when given to a healthy individual. This means that treatment is individualized. The second tenet is that remedies retain biologic activity if they are diluted and agitated or shaken between serial dilutions, even if no original molecules remain.

Homeopathy has been demonstrated to be twice as efficacious as placebo for rheumatic conditions, but the outcome was not specifically pain. Furthermore, the interventions included both simple and complex homeopathy as well as individualized and standard treatments and may not represent the system of homeopathy as practiced. *More research is needed in this area*.

Herbal Therapy

Pooled results from trials of gamma linolenic acid (GLA) found in borage seed oil, evening primrose oil, and blackcurrant seed oil showed significant reduction in pain as compared with placebo. GLA suppresses release of inflammatory mediators, perhaps by a direct effect on T cells. Other herbals studied included feverfew, Tripterygium wilfordii hook F (T2), topical capsaicin, and Reumalex which contains willow bark. *With the exception of GLA, more studies are needed before conclusions about efficacy.*

Glucosamine and OA

Glucosamine is a slow-acting drug for the treatment of osteoarthritis. In addition to its effects on cartilage metabolism, anti-inflammatory effects have been found in rat models. *Results from RCTs suggest strong support for glucosamine in the pain management of OA.*

Chondroitin Sulfate and OA

Chondroitin sulfate also has anti-inflammatory effects as well as an effect on cartilage metabolism although the mode of action is not completely understood.But, evidence supports the efficacy of chondroitin preparations for pain from OA.

Some herbals and nutraceuticals are beneficial in reducing pain. Both avocado/soybean unsaponifiables and devil's claw demonstrated promising support for pain of rheumatic deseases. Furthermore, these treatments appear safe to use.

Chiropractic and massage

Chiropractic and massage therapy are both "alternative" treatments often employed by patients for pain control.

Chiropractic is a system of healthcare that is based on the belief that the nervous system is the most important determinant of health and that most diseases are caused by spinal subluxation which respond to spinal manipulation (SM). SM, in turn, was described by The American Chiropractic Association as "... a passive manual maneuver during which the 3-joint complex is carried beyond the normal physiological range of movement without exceeding the boundaries of anatomic integrity. The essential characteristic is a thrust—a brief, sudden, and carefully administered `impulsion' that is given at the end of the normal passive range of movement. The `dynamic thrust' is the defining factor, which distinguishes manipulation from other forms of manual therapy.

Massage is a method using various manual techniques, applying pressure and traction to manipulate the soft tissues of the body. The American Massage Therapy Association defines massage as the application of manual techniques and adjunctive therapies with the intention of positively affecting the health and well-being of the patient. Touch is fundamental to massage therapy and allows the therapist to locate areas of muscle tension. These areas can be treated, conveying a sense of caring using touch with the optimal amount of pressure for each person. The friction of the hands and the mechanical pressure exerted on cutaneous and subcutaneous structures are employed to affect the body and the mind. The circulation of blood and lymph is generally enhanced, resulting in increased oxygen supply and in the removal of waste products. Direct mechanical pressure and effects mediated by the nervous system are thought to reduce muscular and mental tension. Numerous forms of massage therapy exist, ranging from conventional muscular massage (ie, Swedish massage) to lymph drainage, deep tissue massage, or Shiatsu. The techniques used in Swedish massage, *the form of massage most frequently tested in randomized clinical trials (RCTs), are effleurage, petrissage, friction, taponement, and vibration*.

Tai Chi

Tai Chi exercise, although practiced in China for hundreds of years, has only recently gained the interest of researchers in Western countries as an alternative form of exercise. Recently, improvements in cardiorespiratory function, balance, muscular strength, flexibility, relaxation and mood state have been associated with Tai Chi. Additionally, reduction in blood pressure, and improvement in aerobic capacity in patients with heart disease have been reported. Tai Chi requires no special facility or expensive equipment and can be performed either individually or in groups. Tai Chi movements are suited for persons of all ages, regardless of previous exercise experience and aerobic capacity. Tai Chi is a low impact, low to moderate intensity exercise incorporating elements of balance, strength, flexibility, relaxation, and body alignment. Features of Tai Chi exercise include weight–shifting between right and left legs, knee flexion, straight and extended head and trunk, rotation, and asymmetrical diagonal arm and leg movements with bent knees. The exercise intensity of Tai Chi is variable and can be adjusted to the patient.

It has been shown that a 15 week Tai Chi group exercise prevents falls in the older patients (Cochane Review 2004)

Yoga

Yoga is a traditional Indian culture and way of life which gives the practitioner a "healthy body and a sound mind" and is believed to alleviate stress and induce relaxation The word yoga is probably derived from the Sanskrit word 'Yug' which means 'controlling the mind'.

It is a 5,000-year-old practice that incorporates proper breathing movement and posture to achieve a union of mind, body and spirit. It involves completing a series of postures, during paying special attention to the breathing — exhaling during certain movements and inhaling with others.

People do yoga for many reasons. For some, yoga is a spiritual path. For others, yoga is a way to promote physical flexibility, strength and endurance. In either case, yoga helps to relax and manage stres The purpose of yoga is to calm the mind in preparation for meditation. One principle of meditation is that stress comes with a racing mind. Meditators observe the flow of thoughts without judging them, a process that helps the mind to slow down naturally.

To be effective, yoga requires training and regular practice.A research on yoga shows it can help control pain by relieving stress and anxiety. The *Journal of Rheumatology* published a 1994 study that showed that in people with osteoarthritis of the hands, those who took yoga classes had less finger pain and tenderness during activity than the control group.

A 1998 study published in the *Journal of the American Medical Association* showed that people who used yoga and relaxation techniques in addition to a wrist splint experienced more relief from carpal tunnel syndrome than people who used the splint alone.

Hatha yoga is getting a lot of interest. *The pain in the rheumatic desease can be relieved by Yoga.But RCTs are needed in this area.*

Reiki

Reiki therapy is an energy healing method based on ancient Buddhist scriptures. It is performed by Reiki practitioners (taught by Reiki Masters). The theoretic basis of Reiki is that disease or imbalance will occur if there is a blockage at an energy center. The Reiki practitioner's hands are in essence the conduit of the universal energy that goes naturally to any area of the recipient's body where it is needed. The practitioner places his or her hands in a series of positions on the clothed recipient's body to facilitate the self-healing of the recipient

Mind-body Therapy

The NIH's National Center for Complementary and Alternative Medicine (NCCAM) defines mind–body medicine as "behavioral, psychologic, social and spiritual approaches to medicine not commonly used." Mind–body therapies (MBTs) include meditation, relaxation, imagery, hypnosis, and biofeedback. However, there has been considerable controversy in the field regarding which of the mind–body modalities should be considered 'alternative therapy'. The most researched MBT for arthritis has been the Arthritis Self-Management Program (ASMP). This community-based intervention consists of education (about the disease and use of medication), cognitive restructuring and physical activity to reduce pain and distress, problem solving, relaxation, and the development of skills to communicate more effectively with family and health care professionals. Earlier studies found the program to reduce arthritis-related pain and disability on average 15–20% from baseline. (Most of the studies examining this program have combined OA and RA patients although the majority have been OA patients *There have been no randomized trials that directly compare such interventions to pharmacologic therapy.*

Balneotherapy

Spa therapy may play an important complemantary role in the treatment of joint deseases.İts almost totally devoid of serious side effects.*The improvement of the pain and related semptoms may contınue in short term or long term.*

Conclusions

In the near future, the necessities are:

education and training of health care practitioners in CAM;

coordination of research to increase knowledge about CAM products;

provision of reliable and useful information on CAM to health care professions, and,

provision of guidance on the appropriate access to and delivery of CAM. (from theThe White House Commission on Complementary and Alternative Medicine Policy-2002)

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L086

THE PLACE OF THE MANUAL THERAPY IN LOCOMOTOR SYSTEM DYSFUNCTION

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When evaluated quantitatively, the muscles are the leading system in the human body. It comprises of phase and tonic (postural) muscles which are in condition of constant balance maintaining a stable connection between the periphery and the cortical and subcortical centers. The muscle system appears to be the regulator of the statics and the dynamics and reacts instantly when a disruption occurs, which is so often thanks to the modern, civilized way of life (improper static and dynamic strain, prolonged sitting in incorrect position, wrong movement and training).

In the daily practice this pathology of the muscle system is one of the most common and we should always have in mind the general rule that the muscles and the joints are one inseparable unity. These two structures cannot function without each other, they are complementary to one another, but they also suffer together.

The manual medicine examines the physiology, pathophysiology and the prophylaxis of the reversible functional disorders of the motive and supporting apparatus. These functional disorders are usually defined as a blockage, which is a synonym of a "somatic dysfunction" in the American literature or a "segmentary and periphero-articular dysfunction" in the literature of some other countries.

A blockage is defined as:

1. A status of reversibly disturbed function of the joint play, meaning a limited mobility. A joint could block at any point of its movement, in one or more directions.

2. The corresponding to the joint muscles increase their tone and eventually reach the status of a spasm in the direction of the restricted movement.

This leads to the so called muscle dysbalance, names by Brugger "a nociceptive somatomotor blocking effect". (Scheme 1)

The examination of the functioning of the adjacent muscles is an important part of the specialized manual examination. Not only the strength and the function of particular muscle groups or single muscles should be tested, but also the disturbances in the muscle balance and coordination.

Depending on structure and function we distinguish two types of muscles, which determine the pathology when damaged.

I. Phase muscles – they quickly exhaust, activate slowly and tend to weaken and relax.

II. Tonic (postural) muscles – slowly exhaust, quickly activate and tend to shorten. (Table 1)

Pathologic findings and disturbances of the muscle function

The most common findings in the cases of limited mobility as a result of the damaging of the muscle system are the following:

1. Muscle hypertone

A. Increased muscle pressure at rest described as "trigger point" or "tender point".

"maximal point";

"segmental irritation zone (point)";

Myositis, myogelosis, tendomyositis.

B. Increased tone of the whole muscle or muscle group;

C. Generalized muscle hypertone – fibromyalgia in example

2. Muscle shortening:

A. Reflected shortening;

B. Reversible structural shortening;

C. Irreversible structural shortening (contracture).

3. Decreased tone at rest (hypotone):

A. Reflected muscle hypotone

B. Peripheral paresis.

4. Disturbed muscle activation (hypotrophy):

A. Disturbed stereotype and motive model (Motor patterns);

B. Paresis.

5. Decreased muscle strength:

A. Reflected via inhibition;

B. Disturbed stereotype;

C. In cases of overstretching;

D. Structural neurogenic or myogenic.

Any irritation exceeding the threshold of irritability of a certain anatomical structure leads to an evident increase of the tension (hypertone) in the segmentary connected muscles and also to a significant sensibilization if irritated additionally. If the disturbance continues an evident, solid spasm is reached.

Based on the principle of the chain connections this spasm eventually leads to atrophy or hypotrophy of the functional antagonists and to disturbance of the gamma innervation.

The registered and established dysbalance reflects directly the joint apparatus, the arthro-muscular coordination breaking up and the syndromes escalating.

Considering the described disturbances in the manual medicine we observe the following most common syndromes, provoked by muscle hypertone, muscle shortening and muscle spasm.

I. In cases of functional blockages in the cervical spine

The cervical spine is the most mobile, but also the most vulnerable section of the vertebral column.

1. Cervical blockages with or without headache and vertigo, with increased muscle tone of the cervical extensors.

2. Scalenus-syndrome usually as a result of cervical blockages or a blockage of the first rib. Very often there is a chain connection manifested with a spasm of m.pectoralis. It usually manifests clinically except with pain and spasm, but with a feeling of air shortage. Its elimination leads to a significant improvement of the breathing.

3. Torticolis acuta syndrome – in case of blockages of C2/C3 and C1/C2 with provocation of spasm of the cervical extensors, the paravertebral muscles and m.sternocleidomastoideus.

4. Spasm of m.levator scapulae. It is most usual in case of a blockage of C2/C3, seldom of C1/C2.It manifests with an acute pain syndrome in the projection of angulus superior scapulae and proc.spinosus of C2.

5. Spastic or shortened m.trapezius (pars superior) – with expressed "gothic" shoulders, often with headache and hypomobility. This syndrome could imitate the spasm of m.scalenus.

6. Spastic m.sternocleidomastoideus – most often in case of a blockage of C0/C1, rarely of a blockage of C1/C2 and C2/C3. It manifests with painful sternoclavicular joint, painful proc.transversus of C1, painful areas in the region of the cranium and the face accompanied sometimes with a spasm of a part of m.pectoralis (pars subclavicularis).

II. Muscle dysbalance in the thoracic region

1. Spastic m.pectoralis - in case of damaging the subclavicular part the shoulder is involved, which manifests in palpation not only of the spastic muscle, but also of the tendon, which protrudes onwards as a fake clavicle. The damaging of the lower part limits the

elevation and the tendon is palpated spastic, painful and stretched in the armpit (fossa axilaris).

2. Spastic m.erector spinae for the cervico-thoracic passage and the thoracic region - most often in case of blockages of the intervertebral joints in these locations. The muscle spasm is very difficult to improve, even after manual deblocking.

3. Spasm of the middle part of m.trapezius and also of the interscapular muscles - it manifests as a dorsalgia, with painful proc.spinosi of Th5 and Th6 and sometimes with pseudoradicular pain in the upper extremities.

4. Maigne syndrome - with blockages in the thoraco-lumbar passage and muscle dysbalance in the projection of crista iliaca and os pubis.

II. Muscle dysbalance in the lumber region and the lower extremities.

1. Spastic m.rectus abdominis - it may cause pseudovisceral pain, painfulness in proc.xiphoideus, the lower ribs and in the projection of the symphysis. This syndrome leads to a disturbed inclining backwards and to a shifting of the shoulders towards the pelvis.

2. Spastic m.iliopsoas - most often in case of blockages in the thoraco-lumbar and lumbo-sacral passages. The functional blockage of the sacroiliac joint leads to a spasm of m.iliacus.

3. Spastic m.rectus femoris - most often in case of a blockage of L3/L4 (L4 syndrome).

4. Spastic m.piriformis - in case of coccygodynia and blockages of L4/L5.

5. Spastic m.gluteus medius and m.tensor fasciae latae – in case of coxalgia.

6. Spastic m.quadratus lumborum in case of blockages in the thoraco-lumbar passage.

IV. Syndromes connected with muscle dysbalance in the shoulder joint and the upper limb.

The shoulder joint is a favorite projection of predilection to pathological reflexes. The shoulder pain during myocardial infarction, biliary colic and pancreatic diseases has been known long ago. In the most of the cases after the healing of the primary disease the reaction of the shoulder persists or even worsens, becoming autonomic and causing with it's tissue modifications severe functional disorders in the mechanics of the shoulder joint, it's ligaments and muscles. Usually in the diseases of the shoulder joint two types of development occur:

Type 1: Contracture under the form of "frozen shoulder" with a characteristic pathology and disorders in the capsule.

Type 2: With muscle pathology under the form of Periarthropathia humeroscapularis.

The most common disease, cured with the methods of the Manual therapy, is the related with the muscle dysbalance Periarthropathia humeroscapularis. A general symptom for the disorders type 2 is the so called "painful arc", where the elevation of the arm to the horizontal line is characterized with moderate or acute pain, which disappears when the abduction goes beyond 90-95º. During this disease it is very often diagnosed an accompanying blockage in the cervico-thoracic passage, which deblocking leads to a decrease of the pain and an improvement in the disturbed kinesiology.

The usual muscle dysbalance characteristic of this disease is the following:

1. Hypertone of m.supraspinatus – it is characterized with pain in the shoulder joint, usually around the projection of tuberculum majus, and also an initially disturbed abduction.

2. Hypertone of m.infraspinatus – this pathology is characterized with painful external rotation against resistance.

3. Hypertone of m.subscapularis – this muscle is the major internal rotator of the shoulder joint being an antagonist of m.infraspinatus. The contraction of this muscle leads to adduction and internal rotation, which manifests the pathology of the "frozen shoulder".

4. Hypertone of the upper part of m.biceps brachii – characteristic about this syndrome is the pain if supinating against resistance. Here the "painful arc" may not be observed, but the long tendon of the biceps and his upper part are very painful.

In all the mentioned painful disturbances in the muscle tone it is usually observed a dysbalance in the atlantooccipital joint, as also in the segments C4, C5 and sometimes distally.

How to conduct Manual therapy in the muscle dysbalance cases

Depending on the pathology and the cause for the muscle dysbalance, the Manual medicine should treat the disturbances individually.

In the Manual therapy for the muscle dysbalance cases we have the following rule: **The relaxing and the stretching of a spastic muscle should always be carried out before the strengthening and the stimulation of the hypotrophic muscle.** We usually make use of these two approaches:

1. Direct approach, meaning a manual deblocking of the revealed blockage of the joint and PIR (MET) (Postisometric relaxation) for the connected muscle hypertone. Usually after a successful deblocking the muscle hypertone disappears or decreases in the following minutes.

2. Indirect approach – PIR for the spastic and painful muscles and manual therapy if needed. This approach is a gentle one and carries less risk. It could be performed by younger and less experienced manual therapists or in cases of risky patients and in hazardous regions of the vertebral column.

L087

ACUPUNCTURE IN REHABILITATION UNIT

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INTRODUCTION

Much interest has been expressed in the ancient practice of acupuncture. In particular, the recognition of pain management as a specialty in it's own right has encouraged the exploration of this techenique as a means of offering a non-toxic and a relative way of controlling pain. In the correct hands it's a safe way which can sometimes be very effective when all else has failed. This is not to say that acupuncture should be used as a last resort only, on the contrary there is much to support the use of this modality as a first option. Acupuncture has also the advantage of being cheap and as a physical produre it is readily acceptable and easy to incorporate into the physiotherapy department, and this is another good reason why the techenique should be available there. An alternative method of stimulating acupuncture points is to apply local heat. This techenique is called moxibustion, and it is still used by those who adhere to the so called traditional approach.

LAR VICHAYABHAI
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HISTORY AND DEVELOPMENT

It was noticed that certain medical problems seemed to improve significantly, or even completely disappear after sustaining relatively a minor discrete injury to the surface of the body. It becomes apperent that stimulation of certain specific areas on the surface of the body could produce changes which sometimes resulted in a beneficial theurapeutic effect. This realisiation was a major factor in encouraging the persuit of greater knowledge in this area. It was noticed that certain acupuncture points seemed to have particular properties which could be used to an advantage in diagnosis. For example each meridien system has a point called and which sometimes become spontaneously tender on palpation when the patient's problem is related to that particular meridien.

It was important to note the following:

a- Acupuncture has evolved within the framework of a total medical system and itself forms only a part of that system.
b- Acupuncture was not(and is not today) limited to the management of pain only, has useful applications in the other areas of medical practice.
c- An incressing knowledge of pain pathways and mechanisms has led to greater understanding of pain mechanisms involved in the use of acupuncture for pain modulation. As a result two general viewpoints have emerged regarding the practice of acupuncture, so called tradititonal and western approach, and these two approaches are briefly mentioned below.

Traditional acupuncture. This approach is steeped in Chinase philosophy. A person is regarded as being made up of three facets: Body, mind and sprit. Each part is closly related to other two. The body is regarded self repairing, self regulating homeastatic mechanism. It is animated by a life force or energy called CHİ or Qİ anergy. The approach to treatment is to locate the energy imbalance and to deal with it by treating the meridien points. By stimulating these points the internal energy system can be influenced and hopefully the blockade can be rectified which will ultimately allow the body to restore normal function.

Western system: There is no doubt that stimulation of the body surface has consequences that can be measured objectively and subjectively. The following observations have also been made by workers in this field relating to the effects of needle acupuncture.
a- acupuncture points can be located on the surface of the skin by using electrical means. The skin impedance drops sinificantly over an acupuncture point.
b-There is a 75% correspondance between the traditional acupuncture points used for pain releif and well known trigger points used in the west for the treatment of pain in the same area of the body.
c- If spontaneously tender points are treated(these are points which are not necesserely known as trigger points of acupuncture points) there is often an improvement in the patients condition.
d- The analgesic effect of acupuncture can be partially reversed by the administration of naloxane. As naloxane is morphine antagonist this suggest that part of the pain relieving effect ic acheived by production of endogenous opiates.
e- Local anasthetic applied to an acupuncture point before it's use or an impaired afferent nerve supply from the point rendres that point inefffective in it's ability to produce pain releif. This obviously suggest that intact afferent nerve supply is essential for the acupuncture point to be effective.
f- Histologically there seems to be a correlation between acupuncture points and neurovascular bundles.
g- Other changes have also been noted(eg. in levels of WBC and blood sugar).

To what kind of diseases we can make acupuncture in rehabilitation unit:

1- Pain syndromes and acupuncture
2- Hemiplegie(stroke) and acupuncture
3- Spasticity and acupuncture
4- Post-Polio Syndrome and acupuncture
5- Cerebral palsy and acupuncture
6- Fascial paralysis and acupuncture
7 -Trauma of peripheral nerve.

An increasing knowledge of pain pathways and mechanisms has led to a greater understanding of pain mechanisms involved in the use of acupuncture but we haven't known already to much how acupuncture works in hemiplegia, spasticity, polio, C.P and peripheral nervous diseases. We need more comprehensive double blind and controlled studies to reveal the effect and mechanisms of acupuncture in those diseases.

HEMIPLEGIE (STROKE)

In a study made by Johnson et al. they randomized 78 patients with severe hemiparesis of the left or right side within ten days of stroke onset. 40 to a control group receiving daily physical therapy and occupational therapy 38 to a group that they treated with acupuncture(sensory stimulation) twice a week for ten weeks. Patients given acupuncture(sensory stimulation) recovered and to a greater extent than the controls. The mechanism underlying the effect of acupuncture on the treatment of stroke patients is not understood at this time. Research from China has suggested that needle acupuncture on the scalp increases cerebral blood flow in stroke patients. Omura stimulated St 36 on the paralized leg in stroke patients and observed an increase in cerebral blood flow. Chen and Erdmann stimulated GV 26(on the upper limb) in rats and observed an increase in tissue oxygenation to the frontal cortex areas bilaterally. Thus results of above studies suggest that acupuncture may increase cerebral blood flow. and circulation. Additional research with acupuncture in the treatment of paralysis due to stroke appears warranted. These studies would be especially valuable if conducted in combination with regional cerebral blood flow monitoring.

SPASTICITY

To study the effect and mechanism of electrical stimulation in treating spasticity, EA was used on acupoints LI 4, Lu 10, St 36, Bl 57. The short term application of high frequency EA(100Hz) produced an immediate antispastic effect in contrast to low frequency EA(2Hz). After application of high frequency EA two times a day for three months the antispastic effect was stable. Recent experimental results showed that EA may release dynorphin from the spinal cord in humans. We infer that by enhencing the production of dynorphin in CSF, high frequency EA decreases the exitability of the motor neurons in the anterior horns through the kappa opiate receptors, thus ameliorating the muscle spasticity of spinal origin.

POST-POLIO SYNDROME (PPS)

The objective of this study was to evaluate the effectiveness of electrostimulation of auricular acupuncture in the treatment of confirmed PPS patients. Short and long term responses in 12 subjects were measured. Good or excellent results were obtained in all patients. 66% reported to return to their preexisting levels of health. The modality of auriculotherapy shows promise of being asucceesful and definite therapy for patients with PPS.

CEREBRAL PALSY(CP)

A study made by Umlauf the efficaccy of the long term application or modified YNSA was verified in 58 children, aged 1-1.5 years, with predominantly perinatal CP. These patients suffered from various degrees of motor and psychic disturbances whose severity and dynamics had been followed up before inişţiating the therapy and it's course by specialized centers of childrens neurology. In course of long standing treatment it also enables the positive influencing and preventing muscular and tendineous contractures.
Another study made by Stockert. The author concluded that the very onset of treatment cmbined with vojta therapies in CP may be concidered helpful in children.

FASCIAL PARALYSIS

If acupuncture is helpful for the healing of Bell's palsy is still controverial. We need more comprehensive clinical studies in Bell's palsy with acupuncture.

TRAUMA OF PERIPHERAL NERVE

Acupuncture may accelerrate healing of trumatized peripheral nerve. This is also a controversial topic. We need further studies on it.

THE FUTURE OF ACUPUNCTURE

Acupuncture has much to offer in the management of painful conditions, but it has to be stressed that like other modalities it has it's limitations. Althought at present the use of acupuncture is mostly limited to the management of pain, there is much wider field of application opening up. Some other areas were acupuncture is found to be useful are:
1- In the treatment of drug addiction

2- In the treatment of upper motor neauron type spasticity.
3- In the treatment of chest conditions
4- In the treatment of skin conditions

A great deal of research needs to be undertaken, not only in connection with special conditions, but also in invastigating the relationship between acupuncture and other types of treatment. e.g connective tissue massage, reflexology and development of hot points in painful conditions.

It may be concluded that acupuncture is a valuable tool in the rehabilitation units. It's not a panecea, but it does make a useful contribution to the management of painful conditions. Every effort must be made to explore the use of this therapy, particularly in view of it's relative simplicity of application, low cost and effectiveness. In particular acupuncture must develop as a treatment of first choice rather than being used as a last resort

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L088

BEDSIDE DIAGNOSTIC TECHNIQUES IN NEUROPATHIC PAIN

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The Pain Taxonomy Committee of the International Association for the Study of Pain (IASP) has defined pain as an "unpleasant sensory experience associated with actual or potential tissue damage or described in terms of such damage." Under normal circumstances, pain is an appropriate physiologic response experienced when nociceptor sensory units (mechanical, thermal, or chemical) are activated to transmit afferent impulses to the conscious level. Pain initiated in this way is referred to as nociceptive. However, neuropathic pain (eg, postherpetic neuralgia, diabetic peripheral neuropathy, and trigeminal neuralgia) is initiated by a primary lesion or dysfunction in the peripheral or central nervous systems, and it is frequently diagnosed poorly or late in the course of the causing disease.

When neuropathic pain is suspected, a focused neurologic examination should be performed, along with interpreting verbal pain descriptors, in order to provide the most appropriate treatment

Verbal pain descriptors should be elicited when evaluating the patient with neuropathic pain. Certain verbal descriptors, such as "burning," "numbness," and "tingling," have a higher tendency to be used by patients who are describing neuropathic pain compared to that of nociceptive pain and can provide further insight during the patient examination.

Neurological examination can provide insight into pathophysiologic processes involved in the signs and symptoms of neuropathic pain. This involves motor system evaluation, somatosensory assessment, and autonomic nervous system examination. Along with the neurological examination, a medical history focused on co-morbid conditions, can easily be performed in an office setting. Thus, such an approach provides an overall assessment and accurate diagnosis of the impact of neuropathic pain on a patient.

L089

REHABILITATION MANAGEMENT OF SEXUAL DYSFUNCTION IN SPINAL CORD INJURY

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The spinal cord injured person overwhelmed by a bewildering array of medical, surgical and allied health specialists needs an outstanding physician. Someone to look after his medical problems and orchestrate the activities of all those involved in his daily care. Someone, who can explain the whole bewildering process. This physician should be an expert in the field of spinal cord injury; someone can relate on a peer level with the surgical and medical specialist that may be necessary to manage the multiple system problems endemic to spinal cord injury; someone to communicate with and direct the team of nurses, therapists, social workers, psychologists, orthotists and others who are active throughout sequential phases of his initial treatment and subsequent medical management. The rehabilitation specialist should be the physician who can be asked all questions about his/her issues by the patient. Medicine has been traditionally organized around organs and body systems like cardiology, urology and etc. However, rehabilitation medicine is a comprehensive and holistic approach to the disabled people. So, all aspects of paraplegics' and tetraplegics' life are in the concern of the rehabilitation medicine.

Self-concept is a composed of somatic, sexual, vocational and social parts. All disabling events especially spinal cord injury give a harm to the four parts. So, reconstruction of self is of importance, but there are two selves 1-the non-disabled and 2-the disabled self). The non-disabled self still exists but needs to reconcile itself with the disabled self. This, according to Yoshida, necessitates a pendular reconstruction involving "identity transformation". Unfortunately, rehabilitation focuses almost exclusively on the disabled self, being preoccupied with physical recovery, giving rise to the omission of sexuality in the rehabilitation setting.

Addressing sexual issues in the rehabilitation medicine has been recently developed. Most of the rehabilitation staff is reluctant to study on sexual issues. There are two important reasons: 1. Many rehabilitation professional have no formal education in sexuality. 2. It is difficult to discuss sexual issues because these issues may create a distressing atmosphere. To my personal experience, the rehabilitation staff is shyer than the patient while discussing this issue.

Sexuality is an integral part of each person's life. Each person is sexual being. Sexuality is the integration of physical emotional, intellectual and social aspects of an individual's personality that express itself as maleness or femaleness. It enables us to define ourselves. The brain is known as basic sexual organ. No one is too disabled to be sexual. Disabled people are human beings and they

are not asexual. In addition, sexuality is a form of communication, both verbal and nonverbal. In this context, sexuality is much wider than genital acting.

Other than masturbation and fantasy, sexual expression occurs within the context of a dyadic relationship.

Another development is to stress similarities between able-bodied and disabled population rather than difference in sexuality. The sexual issues of people with disabilities are not so different from the issues of the able-bodied population. Masters and Johnson asserted that sexual dysfunction occurs at one time or another in at least 50%of the general population. Moreover, a study of 52000 men in the USA general population showed that 55% reported dissatisfaction with their sex lives.

The language of sexuality is more than physical contact. Unspoken clues such as eye contact, a soft voice, gestures and casual movement by the partner all convey affection and love. We must keep in mind that self-esteem, self-confidence, body image, feelings of being sexually attractive are essential in sexual life. Recent studies have suggested the importance of psycho-social factors in the sexual functioning in the spinal injured contributing to anatomical and physiological losses. Studies have shown that the degree of sexual adjustment and functioning of male spinal cord injured is directly related to their success in vocational training and employment. However, in one study female spinal injured persons from high income and social statue has been found less satisfaction in their sexual experiences compared with the lower statue of spinal cord injured females.

Our society has been influenced by negative stereotypes on sexuality. Such stereotypes against people with disability often lead to discrimination, violence and sexual abuse. Denial by staff members of sexual issues among patients only adds to feeling of isolation and helplessness experienced by people with disabilities who are being sexually exploited.

So the first step of treatment of sexual dysfunction is to accept that the spinal cord injured people are sexual beings and have the right of sexual education, treatment and expression of him or herself.

But, female patients seem to be unluckies in that field. Rehabilitation attention focuses on issues associated with men's bodies, and is seldom concerned with women's bodies. The role of woman in the sexual acting is assumed as passive so there is small number of the study on the sexual issues of the spinal women in the literature. The problem seems as universal. Women rarely reach the information or advice in that field except fertility.

What are the losses after spinal cord injury?

In men, libido decreases, spontaneous feature of the sexual activity losses, having sexual partner could be difficult, orgasm also losses. Besides, organic losses are seen like erectile dysfunction and lack of ejaculation and infertility. The frequency of sexual activity has been shown to decrease.

In women, libido decreases, spontaneous feature of the sexual activity losses, as more strikingly having partner can be difficult, orgasm also losses. Besides, women may experience some organic losses, like decreased vaginal lubrication. In the first three month period, 65-70 % women experience amenorhea. The cyclus will reestablish later. The female spinal cord injured restrain their ability to give a birth. Especially, tetraplegic females have subjected to difficulties in order to keep menstrual hygiene. The frequency of masturbation has been reported a decline in the spinal cord female. It is unknown whether the situation is same among spinal cord injured males.

What and when is done in the spinal cord injured patient? To my opinion, rehabilitation specialist who is responsible for the patient should undertake the management of sexual issues. Rehabilitation team's members should have enough knowledge at this topic. They should not fear the questions from the patients and caregivers, address their questions within their knowledge. If they are not chosen for that area, they should encourage the patient and caregivers obtaining information and lead them to the team leader. If there is an issue more complex, the rehabilitation specialist can refer his/her patient to the other specialists.

The question of when to initiate discussions and teaching about sexuality is a difficult one to answer. When the injury is so new that there is still concern for the patent's survival, sexuality is not an appropriate topic. Often, we think the appropriate time of talking about sexuality is when the patient has been already focused on this issue. Unless there is a demand from the patient, we usually ask the patient if he/she needs any counseling after three months post injury. One indication that a patient is thinking about sexual activity and ready for discussion may be when the patient makes a pass at or in other ways discusses sexuality with the nurse or other staff. As at other clues when a patient may behave inappropriately sexually, the nurse or other staff must keep in mind that the patient needs to view him self or / herself as a sexual person. Regardless of the motivation, reprimands are not appropriate.

Often patients will enter a rehabilitation center after they are no longer acutely ill. At this time they should be informed that sexual rehabilitation is a part of the overall rehabilitation program and inclusion of their sexual history in the initial inter view reinforces this. By informing patients that their sexual concerns will be addressed, the patients feel more comfortable and encourage make an attempt obtaining information. After questioning if the patients are ready to a conversation, an interview should be made with the patient. In this interview, a detailed sexual history should be taken, and learned about concerns of the patient. It is appropriate to ask question about his/her sexual partner. It would be ideal to offer the patient an opportunity to invite the partner to be present for any part of the evaluation.

The key of successful rehabilitation is a comprehensive management of the patient using holistic approach to him/her needs (appropriate medical and nursing care, physiotherapy, social and physiologic support). Sexual treatment and counseling just stand up on this basement. Indeed the first step is helping patients to improve their self-esteem and adjust their body image. A wheelchair – bound person may not have a sexually attractive image of self. Adjustment of wheelchair and other devices to new body image should be carried out. Also pain and depression should be tried to eliminate.

Sexuality also covers wide spectrum of beliefs and attitudes. The staff must know the patient's beliefs and attitudes, and respect them. It is important to keep in mind that we just offer alternatives and depict the wide range of the repertoire of human sexual behavior. The decision what kind of activity is appropriate or not belongs to the patient and his/her partner. Sexuality is the most intimate part of the person. The physician or sexual counselor should keep a nonjudgmental stance. This stance must stop short of sanctioning attitudes and practices that are psychologically or physically harmful to the patient and his or her sexual partner e.g. sadomasochistic activity, sexual relations with children and auto erotic asphyxia.

Usually, various aspects of sexual behavior which substitute coitus are kissing, hugging, massage, manual or oral stimulation of genitals, digital stimulation, and using sexual aids like vibrator and dildos. Stress of coitus may give harm to the patient also or vice versa. This situation should necessarily be balanced. The patient developed some erogenous zones just above the injury level. The patient and his/her partner should explore the new zones.

In the past, most of the literature stressed that the appropriate role for persons with SCI was to satisfy their partner. Their own satisfaction was to derive from the pleasure that they give their partner. For some, this may be sufficient, and is one alternative for sexual expression. It is not, however, the only form available. Receiving pleasure is equally important and possible.

The patient should be assured that myths in sexuality are not valid. For example male patients are convinced to assume more passive

role and let female partner assume more active role during intercourse is appropriate.

If there are more basic issues that need to be resolved, sex therapy is postponed. One major example of a more basic problem is alcohol or drug abuse. This is a contraindication for sex therapy. The reason is not only the impact of drugs on psychological and physical functioning but also the pathological interpersonal and family relationship that are present in substance – abusing patients.

Adjustment

Those who do resume sexual relations are advised to keep separate the roles of caretaker and partner to preserve intimacy, which is diluted when one spouse is perceived as needy and helpless compared with the other. The process of sexual adjustment, and the balancing of the roles, can be facilitated by providing information and counseling.

To the extent that the disabled person can learn to value his or her new sexual abilities as opposed to trying to regain the same sexual life as before and establish some method of communication, he or she will achieve a satisfying sexual adjustment. Disabled patients who achieve success in sexual functioning do so because of increased communication and a willingness to experiment with developing romance and intimacy, as well as technique. Especially important is the development of skills in communication and intimacy.

Individual Counseling

A distinction between sexual rehabilitation counseling and sex therapy should be made. The principles are similar but sex therapy assumes that sex is the highest priority issue to be dealt with at the time of the treatment. Usually, sex therapy deals with sexual problems caused by stress or other psychological variables, including conflict in the family or couple system. Sexual rehabilitation counseling assumes the presence of a physical disability and further assumes that sexual adjustments are only one of a constellation of changes that are being dealt with by the client.

Focusing specifically on enhancing intercourse or on alternatives to intercourse may be appropriate in a simple sex therapy procedure but is too narrow for sexual rehabilitation counseling when there may be organic or even interpersonal skill deficits that serve as barriers to psychological and sexual adjustment.

The issues of identity, dependency, self-esteem and values are among the major concerns the patient needs to face in the course of his or her adjustment to disability.

Marital Therapy

The initial stage of therapy with couples regarding sexual rehabilitation concerns involves the establishment of therapeutic rapport. The next stage of the process is a thorough assessment of their physical psychological, interpersonal and sexual strengths and weaknesses. The next step is the integration these data into an individualized treatment program. The next phase of the therapy is to provide education and information relative to the sexual changes encountered, ways of coping with altered body image, alternatives to the previous repertoire, and emotional communication skills. Experiments at home involving new behavior and attitudes, self stimulation, sensate focus and message exchange should be ordered then for ongoing sexual adjustment process. If any spouse has alcohol or drug addiction, therapy must be postponed.

L090

RARE COMPLICATIONS IN SPINAL CORD INJURY

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Complications secondary to spinal cord injury(SCI) do not only interfere with quality of life, health and well-being of these patients, but also have a great impact on rehospitalisation rates and the hospital costs.

A variety of distressing complications can occur both during the acute phase and long after the injury. Although most of the complications due to SCI are well recognized, some of them are rarely seen. In the following you will find a brief review of both common and rare complications in SCI.

Autonomic and Cardiovascular Complications

Cardiovascular complications may be direct or indirect. The neurologic injury itself causes the direct complications owing the interruption and decenterilization of the autonomic nervous system. Indirect complications are the result of immobilization and sedentary lifestyle.

Hypotension, cardiac arrhythmias, bradycardia, orthostatic hypotension, thermoregulation disorders and autonomic dysreflexia are the common direct complications. Cardiopulmonary arrest is rare. Deep venous thrombosis and pulmonary embolism are the thromboembolic disorders that occur acutely.

Hyperlipidemia, decreased high-density lipoprotein levels are observed in chronic SCI patients. In this phase, atherosclerotic heart disease is the leading cause of mortality.

Normochromic and normocytic anemia is seen in the acute phase. In chronic SCI, anemia of chronic illness is observed.

Respiratory Complications

Impaired secretion management, atelectasis, and hypoventilation are the main respiratory problems in SCI. Most of the respiratory complications are secondary to these issues.

In SCI patients and especially patients with atelectasis, the pneumonia occurs because of ineffective cough. The pneumonia is most likely to develop in the atelectatic area of the lung. Pneumonia is the leading cause of death during all phases of SCI.

Atelectasis may also lead to the development of a pleural effusion; if the effusion becomes infected, the patient has an empyema. A trapped lung may occur due to empyema.

Aspiration occurs in about 5% of all SCI patients with a higher risk in older patients. Pneumonia and acute respiratory distress syndrome may be the results of aspiration.

Sleep apnea and sleep disordered breathing incidences are reported in a range between 15%-60% in SCI patients. In SCI patients the sleep apnea is primarily obstructive with a small percentage of central sleep apnea. Nasal stufness, snoring and medication given for pain and spasticity, and higher level of injury may interfere with this problem. The complication of sleep apnea are hypertension, pulmonary hypertension and cor pulmonale, congestive heart failure, deterioration in mental function, daytime sleepiness and cognitive changes.

Gastrointestinal Complications

Both in the acute and long term period of SCI, gastrointestinal related complications are significant causes of morbidity and mortality. Constipation, acute abdomen, ileus, gastritis and ulcers, hemorrhoids, cholelithiasis, pancreatitis, superior mesenteric artery syndrome and cancer are gastrointestinal related complications seen after SCI.

Endocrinologic and Metabolic Complications

After SCI, changes in body composition, decreased energy expenditure capacity, nutrition, changes in endocrin functions, glucose metabolism, electrolite balance, and osteoporosis may occur.

Hyperphosphatemia, hypermagnesuria, hyperuricosuria without hyperuremia, and decreased urine creatinine are frequently seen early after SCI.

Hyperosmolar hyponatremia is seen especially in cervical injuries. Plasma renin activity and aldesterone were found higher in tetraplegic patients when sitting.

Glucose intolerance is another finding in SCI patients.

Early after SCI, hydroxyprolinuria and hypercalciuria are seen due to increased bone turnover and resorbtion.

Hypercalcemia is rarely seen in adult SCI patients; however, it is a more common metabolic complication in children and adolescents who sustain SCIs. Laboratory studies show elevated serum calcium,

normal serum phosphorus, normal or slightly elevated serum alkaline phosphatase, elevated urine calcium, and reduced 24-hour urine creatinine clearance.

Acute SCI may be associated with thyroid function test changes. Lower serum T3 levels may be observed.

The mean serum testosterone level is significantly lower without a significant increase in serum gonadotropin concentrations. In SCI patients serum testosterone levels do not decrease with age, but do decrease with the duration of SCI.

Growth hormone and insuline-like growth factor-1 may be depressed in patients with SCI.

Neuromusculoskeletal Complications

Various kinds of neuromusculoskeletal complications can be seen after SCI. Time of onset and the severity of the complications may vary. Complications can affect bones, joints, muscles, peripheral nerves, and the spinal cord.

Musculoskeletal pain, osteoporosis and fracture, Charcot spine, cervical spine hyperlordosis or kyphosis, thoracic gibbous deformity and scoliosis may be seen.

Upper extremity pain especially shoulder pain is commonly reported. Olecrenon bursitis, lateral and medial epicondilitis, carpal instabilite, dorsal radiocarpal impingement, scaphoid impaction syndrome, de Quervain disease, tenosynovitis, osteoarthritis and stress fractures can be observed in weight bearing upper extremities.

Hip flexion contracture is common in patients with fractures at the thoracolumbar junction. Myotendinous contracture of the iliopsoas, hip joint capsule tightness or heterotopic ossification anterior to the hip joint can be the causes of hip flexion contracture. Hip subluxation and dislocation are common in pediatric group and in those with hip adductor or flexor spasms. Degenerative changes in hip joint is more common in tetraplegic patients.

Hamstring and ankle plantar-flexion contractures can be seen.

Peripheral nerve entrapment is common in SCI. Carpal tunnel syndrome and ulnar nerve entrapment at the elbow are most common, besides radial nerve entrapment at the spiral groove, peroneal nerve entrapment at the fibular head and ulnar nerve entrapment at the wrist are also seen.

Worsening myelopathy is seen 5% to 20% of SCI patients. Posttraumatic syringomyelia is one of the most common cause. Another common cause is spinal canal or neuroforaminal stenosis due to residual bone fragments, spine instability, degenerative arthritis, or disk herniation. Kyphotic deformity of the spine with traction on the cord and vitamin B12 deficiency can also cause worsening myelopathy in persons with SCI.

Heterotopic Ossification

It is a common orthopedic complication seen in adult SCI patients. In pediatric group HO is less frequent. The anteromedial aspect of the hip joint is the most common location of HO in SCI. Knee, elbow and shoulder are the less frequent locations. HO is rare in the small joint of the hand and foot. Ossification is extraarticular and is always found below the level of the SCI.

Spasticity

Spasticity is a very common complication among SCI patients. It is more common in cervical and upper thoracic injuries. By the time of the first annual follow up visit it has been reported that the incidence of spasticity increases. One always keep in mind that not all the patients with spasticity need treatment.

Pressure Ulcer

It has been estimated that 50% to 80% of SCI patients, at some time after their injury, develop a pressure ulcer. Pressure ulcers are responsible for physical, social, vocational, and economic costs. They usually develop over bony prominences. The most common sites are sacrum, heels, ischium, and trochanters. Occiputal protuberance, urethral meatus, knees, penis, tibial malleolus are the rare sites that can pressure ulcers develop.

Pressure ulcers have been associated with many complications including, endocarditis, HO, septic arthritis, perineal urethral fistulas, sinus tract or abscess, squamous cell carsinoma (Marjolin ulcers) and contractures.

Once a pressure ulcer has occured there is the risk of reccurance. The reccurance rate has been reported to be between 35% to 60%.

Neurogenic Bladder

Voiding dysfunctions associate most of the SCI patients. These problems not only result in increased urinary tract infections (UTIs), bladder stones, and other lower urinary tract morbidity, but also can potentially lead to kidney complications including renal deterioration.

UTIs can be symptomatic or asymptomatic and can affect lower urinary tract, upper urinary tract or both.

The physician should be aware of other potential problems that UTIs can lead. Those from lower UTIs include epididymitis, prostatic or scrotal abscess, sepsis, or an assending infection to the upper tracts. Chronic pyelonephritis, renal scarring, progressive renal deterioration, renal calculi, papillary necrosis, renal or retroperitoneal abscess, bacteremia and sepsis other potential complications that can occur after UTIs.

Hydronephrosis, vesicoureteral reflux, renal calculi, renal deterioration and bladder cancer are the other main problems of urinary tract in SCI patients.

L091

REHABILITATION IN ACUTE HOSPITALS – STRUCTURES AND RESULTS

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The traditional rehabilitation system in Germany was restricted for a long time to post acute and maintenance rehabilitation measures, most of them carried out in specialized rehabilitation clinics. However, due to the growing significance of rehabilitation in the health system and the society in general, in Germany two changes of the social laws have come into effect in the year 2001:

- The ninth book of social laws with the title "Rehabilitation and Participation of Disabled" guarantees that "disabled persons and persons with threatened disablement receive payment in order to promote self-efficacy and participation" and includes new rules for the co-ordination of payments.
- In the novel of the fifth book of social laws, that deals with the health insurance it is laid down that "the treatment in acute hospitals includes the necessary rehabilitative interventions to be started as early as possible".

In coincidence with these laws new models for the rehabilitation in acute hospitals have been developed and put into practice. All concepts assume that general rehabilitation comprising different conditions will be more effective in acute hospitals than condition-specific rehabilitation units especially with respect to the cost-effectiveness. The only exception is the acute neurological rehabilitation, having separated rehabilitation units in some acute hospitals.

The indication for rehabilitation in acute hospitals is per definition complex limitations of functions and activities as well as imminent participation restrictions. This is often the case if acute health conditions are very severe or combined with severe complications, multi-morbidity especially pre-existing chronic diseases or long-lasting intensive care. Rehabilitation in acute hospitals is restricted to the phase were hospitalisation is still necessary due to needs of acute medical care combined with a relevant need of functional rehabilitation. Rehabilitation is not an alternative for post-acute and

maintenance rehabilitation measures, however, it is a link between acute care and other continuing rehabilitation measures. Therefore rehabilitation in acute hospitals is financed within the framework of the DRG-system. The most decisive step towards the implementation of acute rehabilitation units therefore was the definition of a procedure "acute rehabilitation" in the German catalogue of "Operations and Procedures" (OPS-301 Version 2003) put into practice in September last year. Additionally diagnoses for acute rehabilitation measures are defined in the German DRG catalogue.

Two models have been proposed by the German society for Physical Medicine and Rehabilitation (DGPMR)(Stucki et al 2002):

- Comprehensive acute rehabilitation: this model includes an interdisciplinary acute rehabilitation ward
- Complementary acute rehabilitation: in this model the patient remains in the primary care ward, the rehabilitation is performed by a mobile rehabilitation team

Due to the regulations of the OPS the following structural preconditions are necessary:

- A rehab team chaired by a specialised physician
- A standardised assessment of at least five domains (e.g. consciousness, communication, cognition, mobility, activities of daily living, emotions)
- Written and continuously actualised rehab plan with team meetings
- Specialised reahab care
- At least four therapies from the following list: physiotherapy, occupational therapy, other physical therapies, neuro-psychology, psychotherapy, speech therapy, dysphagia therapy, music therapy, art therapy
- Duration of intervention of at least seven days

The results of the rehabilitation of two hospitals, the one with a ward for interdisciplinary acute rehabilitation, the other with a mobile rehabilitation team are demonstrated by significant improvements of the Barthel index.

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L092

ELECTRICAL STIMULATION TO IMPROVE FORCE AND ENDURANCE

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Percutaneous neuromuscular electrical stimulation (NMES) of skeletal muscles has become clinically established in posttraumatic and inactivity-related weakening as a method of inducing muscle contractile activity. NMES results in increased muscle strength, muscle fiber hypertrophy, and increased muscle cross-sectional diameter when used over a period of several weeks. Studies in patients with CHF registered promising results of NMES in increasing maximal muscle strength. Whereas the influence of NMES on human muscle strength has been demonstrated, its effect on human muscle endurance has not been proved as yet. In small mammals chronic low-frequency (10-20 Hz) stimulation (CLFS) has been used in numerous studies as a standardized model of enhanced neuromuscular activity and oxidative capacity to investigate in detail the molecular events of the fast-to-slow conversion. Contrary to these results on the effects of CLFS on small mammals, the literature on similar studies of human muscle is scarce and incomplete. In a randomized, controlled trial we compared the response of normal human knee extensor muscles to a 10-week low-frequency stimulation. We could demonstrate that CLFS of human vastus lateralis muscle leaded to statistically significant transitions in the pattern of MHC isoforms in the fast-to-slow direction. In addition, CLFS induced changes in enzyme activities of aerobic and anaerobic metabolic pathways indicative of an increase in aerobic-oxidative capacity. The latter changes were accompanied by similar improvements of some functional properties, such as work capacity and VO2 at the anaerobic threshold. With regard to our follow-up study on possible beneficial effects of CLFS on chronic severe heart failure patients, we consider this result as most encouraging.

L093

MECHANISMS OF NEURAL INJURY AND REGENERATION

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Nerve injuries can be divided according to their severity as minimal, intermediate and severe neural injury.

In minimal neural injury, conduction block can be rapidly reversible. Focal action potential propagation failure is also present because of short period of ischemia. In intermediate neural injury, there is failure or slowing of action potential propagation secondary to focal demyelination without axonal damage producing a prolonged conduction block and reduced nerve conduction velocity. Eventually, Wallerian degeneration is seen in severe neural injury. They are also classified according to etiology of the injury: Traumatic and non-traumatic. Traumatic lesions of a nerve usually result in structural changes in the axon with or without separation of its supporting connective tissue sheath. In non-traumatic lesions, the cell body, axon, Schwann cell, connective tissue, or vascular supply can be singly or incombination affected.

Anatomy of Peripheral nerves:

A nerve consists of a cell body and its own axon. The axon is originating from the cell body of nerve and extent to the end organ. Three kind of connective tissue surround the axons:

1. Endoneurium: inner layer of supporting structure in the peripheral nerve.
2. Perinerium: is placed between endoneurium and epineurium. It provides a diffusion to regulate intrafascicular fluid.
3. Epineurium: outermost layer of supporting structure. It provides a protective cushion against compression.

Nerve fibers can be divided into two groups as myelinated and unmyelinated fibers. In myelinated fibers, the surface membrane of a Schwann cell or axolemma spirals around the axon to form the myelin sheath. Each myelinated axon has its own Schwann cell, which regulates myelin volume and thereby myelin thickness. The nodes of Ranvier located at junctions between adjacent Schwann cells.

The largest and fastest conducting fibers include the sensory fibers transmitting proprioceptive, positional, and touch sensations and the alpha motor neurons. Small myelinated or unmyelinated fibers subserve pain and temperature sense and autonomic functions.

Nerve Injury Classification

There are two general classifications for nerve injury:

Seddon 1

Sunderland 2

1- Seddon Classification: There are three degrees or stages of injury according to Seddon.

a. Neuropraxia: The term neuropraxia is used to define mild degree of neural injury. It is also called as "conduction block". The most important aspects of conduction block are its reversibility. In this type of injury the continuity between cell body and end organ is maintained. Wallerian degeneration does not occur. This type of injury usually affects motor fibers. Sensory and sympathetic fibers affect relatively less than motor fiber.

b. Axonotmesis: In this type of injury, only the axon physically disrupted. Enveloping endoneurium, perineurium and epineurium are preserved. Compression of a profound nature or traction on the nerve are the typically etiologies of such lesion. Wallerian degeneration occurs in this type of injury. Both motor and sensory and autonomic fibers of nerve can be affected by the injury.

c. Neurotmesis: There is the greatest degree of disruption a nerve. There are complete disruption in the axon and all supporting connective tissue structure (endoneurium, perineurium and epineurium).

2- Sunderland Classification: It is divided into five types of injury.

d. Type 1 injury: Type 1 injury corresponds to Seddon's designation of neuropraxia. Local myelin injury occurs primarily in larger fibers. Axonal continuity is preserved and Wallerian degeneration does not occur.

e. Type 2 injury: Seddon's axonotmesis is subdivided into three forms of neural insult. Disruption of axonal continuity with Wallerian degeneration is seen and endoneurial tubes, perineurium and epineurium are intact. Axonal regeneration required for recovery. There is a good prognosis since original end organ reached.

f. Type 3 injury: There is loss of axonal continuity as well as the endoneurium. Perineurium and epineurium are preserved. Disruption of endoneurial tubes, hemorrhage and edema produce scarring. Neural recovery is less than optimal in this type of injury. The negatively affected factors on recovery process are as follows:

i. A reduced number of axons capable of participating in the regenerative process.

ii. The second one is the intrafunicular disorganization and scarring.

iii. The third factor is the misalignment of endoneurail tubes. This factor is the major one for limiting recovery.

g. Type 4 injury: In this type of injury there is loss of axonal continuity, endoneurial tubes and perineurium. Epineurium remains intact. Wallerian degeneration and loss of neuronal cell bodies occur. Disruption of the perineurium results in massive disorganization of the internal structure of the peripheral nerve trunk with significant hemorrhage, edema and reactive connective tissue proliferation involving multiple nerve fibers. It is likely that this type of injury results in neuroma formation. The clinical recovery of these this type of injuries is poor and often requires surgical intervention.

h. Type 5 injury: The entire nerve is disrupted. There is a loss of continuity. The epineurium has been completely transected. Profound Wallerian degeneration as well as the proximal axonal reaction develops. Any functional recovery is rare in this type of injury.

What kind of histological changes occur after a nerve injury?

1- Distal segment of the injured nerve:

Waller defined the physiologic reaction to proximal part of injured nerve as "*Wallerian degeneration*". These changes are the first changes of the nerve.

After the insult endoneurial edema can be observed within 1-2 hours with hyperemia in surrounding zone. By several hours, the axon is beginning to break apart. After 72 hours of crush, Schwann cells are in the process of digesting myelin and axonal subcomponents and the endoneurial sheath are preparing for the regeneration of axonal sprouts from above the lesion site. On about day 8 the axon fragments have been digested and Schwann cells are attempting to bridge the gap between the 2 neural portions. At approximately day 12 there is a lessening of the gap separating the two nerve portions and there is continued advancement of the growth cone. Schwann cells and fibroblasts are closing the gap between two neural aspects at about day 20. On day 100 the neural continuity is established and all debris has been removed. However, neural diameter is less than the original size and myelination is not yet present. Certainly by day 200 the myelin is established but at a significantly reduced thickness when compared to preinjury values.

2- Proximal segment of the injured nerve:

The changes are called as "axonal degeneration" or "axonal reaction". Some changes of the injured nerve axon occur just proximal side of the lesion and finally, a characteristic alteration becomes manifest in the perikaryon or nerve cell body. This proximal reaction can be localized to three regions:

a. Peripherally; within several centimeters nerve fiber degeneration can occur. These changes are very similar pattern of Wallerian degeneration progressing along the nerve proximally.

b. Axonal reaction: These changes are known as axonal degeneration, retrograde degeneration and central chromatolysis. Axon's cell body starts to change in this type of reaction.

c. Trans synaptic neuronal reaction

3- Segmental demyelinization:

In some type of insults, the axon is not damaged but preferentially myelin is affected by a disease process. Once the affected myelin is significantly removed Schwann cells proliferate and begin to remyelinate the affected segment of nerve after about 2 weeks of insult. However, there are significantly more internodes and accompanying nodes of Ranvier than prior to the injury.

L094

ELECTRODIAGNOSTIC ASSESSMENT AFTER PERIPHERAL NERVE INJURIES

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Accurate diagnosis is essential in the first step for a successful treatment plan in patients with peripheral nerve injuries. The diagnostic approach should always begin with a thorough history and physical examination. As the diagnostic value of imaging techniques is still limited in peripheral nervous system, electroneuromyography (ENMG) is essential in the localization and proper estimation of the extent of the nerve lesions. Nerve conduction studies and more importantly the needle electromyography (EMG) provide valuable information to the clinician.

ENMG is used in peripheral nerve injuries in various aspects: for diagnosis, differentiation from malingering, localization of the lesion level, estimation of the severity (total or partial), and phase of the lesion (acute or chronic), and of prognosis and course of the lesion (presence of degeneration or regeneration). Extensive background knowledge including electrophysiology and peripheral nervous system anatomy is necessary in making electrodiagnostic investigations for peripheral nerve injuries.

Timing of the ENMG is important both for the electrophysiologist and for the clinician. Immediately after a "total" nerve injury, the only finding in needle EMG might be the absence of motor unit action potentials (MUP) with voluntary muscle contraction, and in nerve conduction studies (NCS), the absence of compound muscle action potential (CMAP) after nerve stimulation proximal to the injury site. Interestingly, the distal portion of the nerve retains its excitability for about 3-5 days and a CMAP can still be obtainable after stimulation distal to the injury site. During this period, nerve excitability gradually decreases and hence, there is a greater need for an increasing intensity and duration of the stimulus for obtaining the CMAP. Therefore the CMAP amplitude and compound nerve action potential amplitude decreases accordingly. However decrease in motor and sensory nerve conduction velocity is minimal in this period. After about 5 days, the nerve loses its excitability and CMAP cannot be obtained. These changes are probably due to degeneration and fragmentation of the axon and a decrease in the amount of acetylcholine.

In NCS, the earliest sign of degeneration in a nerve is its inability to respond the stimulation distal to the injury. This can also be quantitatively evaluated with the 'nerve excitability test'. In EMG the earliest objective evidence of denervation is appearance of abnormal spontaneous activity in the form of positive sharp waves and a few days later, fibrillation potentials in the involved muscles. Positive sharp waves appear about 8-14 days after the injury. Abnormal spontaneous activity initially appears in the most proximal muscles (just distal to the injury site), and then they are seen in more distal muscles.

During the regeneration of the nerve, strength-duration curve and ENMG give valuable information before the clinical recovery. If the nerve is to regenerate, there will be a change in the strength-duration curve and small and polyphasic motor unit potentials, *the nascent MUPs* (previously called as the reinnervation potentials) appear. These potentials are seen about 2 months before the clinical recovery. Other findings include return of CMAP and sensory nerve action potential and gradual increase in their amplitude together with increase in motor and sensory nerve conduction velocities.

Timing of the ENMG study in peripheral nerve injuries is important. The ideal time for the initial ENMG is in the 3rd or 4th weeks after the injury. The need for control studies and their timing depends on initial ENMG findings, severity of the lesion and degree of regeneration.

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L095

FUTURE OF COMMUNITY BASED REHABILITATION IN TURKEY

Proposition of a five –year development plan

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Introduction

After three years experience of Community Based Rehabilitation Program in Istanbul, the time has come to set up new strategies. The aim of this paper is to propose a five-year development plan about the future of comprehensive rehabilitation services for people with disabilities.

Community based rehabilitation (CBR) is promoted by World Health Organization in the early eighties (1). CBR is recognised as a suitable method to rehabilitate people with disabilities in developing countries who have little access to services. The implementation of this method involved shifting the rehabilitation interventions to the homes and communities of the people with disabilities and providing wide coverage at costs that were affortable to the governments of these countires (2).

The population of Istanbul city is 10.0 million according to 2000 census data (3). According to a recent study completed in 2003, the disability prevalence in Turkey is 12.29 % (4). Metropolitan Municipality of Istanbul who had limited sources to provide extensive coverage of high quality services for their disabled citizens, promoted a CBR program in the year of 2001.

In three districts of Istanbul, whose inhabitants were in lower socio-economic status, CBR programs were started. These three programs were co-ordinated by two physiatrists who had one month CBR management training from abroad. All three districts involved a community referral center and staff.

Currently, there are several issues and questions to be resolved in Istanbul-CBR program. The following options are being considered :

- To evaluate the impact of the program
- To make new strategic plans using the time and resources to the maximum benefit of the people
- To give consultation for the associations (government, local governments, some universities and NGOs) who have independent efforts for implementing CBR projects in different geographical regions of the country

It becomes essential for the present program and for the future CBR implementations in Turkey, to establish an innovative way for the sustainability and scaling up of CBR programs in the country.

Current situation in Turkey

The concept of CBR was recommended by the World Health Organization as a solution to the poor coverage of rehabilitation facilities in developing countries due to economic problems (5). Among the developing countries of the southern hemisphere of the world, Turkey has a unique constitution. Turkey is a populous country (68 million by the year 2002), who has many trained rehabilitation professionals. At 1960s, primary health care was promoted by the government and health care units were established all around the country. In the middle of 1980s, many targets about preventive health care has been reached. Unfortunately, after 1990s increasingly less was spent on preventive care and on maternal and child health. The primary health care system was under-funded and ineffective. A large number of health centers are understaffed especially in rural areas nowadays. Although working under-capacity, infrastructure of the primary health care system is still there. Therefore, if preventive rehabilitation measures could be integrated into primary health care, much progress could be achieved.

When we take a look at the social and development indicators, we can conclude that among the developing countries in the world, Turkey lies nearer to the developed world. The infant mortality rate is 39.4 ‰, life expectancy at birth is 68.5 years, adult literacy rate is 87.5 %, Gross National Capita(GNP) is $ 2584 by the year 2002 according to Government Statistics Department's records (6).

The main problem is the inequality of resources among different geographical regions and the gap between the rich and the poor. Even in Istanbul, which one sixth of the total population of the whole country lives, there are many people living in the border of hunger, who can not receive any rehabilitation service and who has no social security. For example, in Kağıthane 41 % of the disabled population had no social security and 51 % of them were illeterate. 21 % of the severely disabled people were not seen by any rehabilitation professional in all their lives.

Although there are many NGOs working on the field of disability, only 2-5 % of the disabled are members of these associations.

Turkish society has a accepting attitute towards life. The majority of people are still committed to their religious beliefs. They accept the unhappy events coming from God, with ease. They are used to live in big families. Even if they have to live in the nuclear family structure in the big cities, the family members are attached to each other. The close relationships between the family members was an important facilitative factor about CBR. The second positive facilitator with the society, was the openness of the people to the innovative ideas and methods. They were very eager to learn and helped each other in group trainings.

In conclusion, if a realistic plan is established about community-based services; the service- network could be built by utilizing local resources and providing the community participance.

Were does CBR lies in Turkey?

In 1997, Turkish Government decided to set up an association in order to constitute a national social policy and strategy in the field of disability Turkish Republic, Prime Ministry Administracy on Disabled was established at 30 May 1997 in accordance with the Act 571 dated 25 March 1997 (4). The main objective was to develope coordination and cooperation with national and international governmental and non-governmental associations. This association is obliged to constitute national social policy and strategy in the field of disability. The Council On Disabled is coordinated by Administracy on Disabled and held once in every two years. The goal of the Council is to discuss and analyze all ideas and developments about disability at national and international levels, make suggestions about the solutions in broader ranges and rise public awareness about disability issues. Works of this Council is mainly used in developing national and international policies about the matters on disability(3).

As a physiatrist working on the field of CBR in the last five years in Turkey, the author's provision in this field is that, more pilot CBR programs should be implemented in the different geopgraphical regions of our country. Turkey has many regions that differ from each other, that has different resources and different society profiles both in urban and rural. These pilot projects may give insight for these differences in the profile of the country. After four years of implementing local CBR programs, working with the coordination of the government, universities, NGOs and the community, a realistic plan of developing a national policy about the people with disability in Turkey could be made. This policy should contain both community - based and institution – based facilities according to the feedbacks from the CBR experience.

Actually, "Turkish Republic, Prime Ministry Administracy on Disabled (AoD) " is responsible for planning the community and institution-based rehabilitation facilities. But the top- down organization of this association is a barrier for the realistic planning. Community –based projects in different geographical regions may provide the useful qualitative and quantitative information for the future sustainable programs. By these projects, the actual needs of the people with disabilities in Turkey could be evaluated from the community level with a CBR approach.

Below, a five-year development plan is prepared as an example. This plan is only a proposed draft, which is concluded after 3 years of field work on CBR. This plan aims to integrate a "bottom-up" approach with a "top - down" one. It is open to discussion with all people who beleives that it is the individual's right to determine his/her own future without barriers.

FIRST YEAR

Training programs should be designed for training new CBR managers (coordinators). After participating to these programs, people from different geographical regions of the country who knows local conditions well, could create innovative designs and apply them in the specific settlements. After the field work is finished and the results are evaluated, the differences of the programs; resources, needs, problem solving approaches of the communities should be assessed. The strategic planning of the rehabilitation network should be discussed with all the stakeholders.

"**Training the Trainers on CBR Management" Project**

A Project Proposal is prepared in order to train new CBR co-ordinators. The project will be implemented by an annual training program for the future CBR managers in Turkish community. The target group will be:

- Rehabilitation professionals who are assigned for implementing CBR programs
- Professional staff working in the area of disability and development
- Policy makers and planners in the area of disability and development
- Initiators and members of disability organisations

The beneficiaries will be the communities (at least from five different geographical regions in Turkey) which the CBR programs will be implemented.

Six (or five) training modules over 12 months will be planned. There will be one week training sessions in each module followed by 2 months field work done by the individual participant. 20 participants will be accepted for the training program.

At least 10 participants (2 for each seperate CBR pilot region) are expected to be professional staff who are assigned to set up CBR programs in different geographical regions.

The other half of the participant group will contain policy makers from the government, professional staff working in disability issues other than health sector and members of disability organisations.

The trainers will be CBR professionals from abroad, who are experienced in the establishment, evaluation and follow-up CBR programs.

Participants will be encouraged do practical work. Assignments will ve given during the two months periods. In the beginning of the training week, each participant will present the results of the activities and comments will be made.

The expected result from this Project is that ; at least five new CBR programs will be started in five different geographical regions at the end of the first year.

It should be stated that this is a draft project that was proposed to Turkish Republic, Prime Ministry Administracy on Disabled in April 9, 2004.

CBR Managers: They work in a region (ward, village or district) whose population is in between 50.000-100.00

Along with their one year training, they will practically learn:

resource analysis

needs analysis

build local network

choose and get together the stakeholders

Give feedback to Administracy on Disabled (AoD)

Coordination of the program

CBR managers are the contact persons between the local region and AoD. After the resource analysis, CBR managers could find the following organizations as stakeholders:

Local health care facilites (health care unit, governmental hospital, social insurance haspital, university hospital, rehabilitation center)

Schools (elementary schools, high schools, universities)

Special education centers (official or private)

Guidance Research Centers

Administrative offices (mukhtar, kaimakam,etc.)

Municipalities

Disabled Persons Organizations

Other non-Governmental Organizations

Local media

Administracy on Disabled: This is core organization promoting the program.

A special CBR unit can be established for the ;

Correspondance with CBR managers

Monitoring and evaluation of the running CBR programs

Facilitation of the CBR programs by building network between the following organizations:

Ministry of Health

Ministry of Education

Ministry of Social Security

Social Solidarity Foundation

Head Office of Women Status

Head Office of Social Security and Society for the Protection of Children

Employees Retirement Fund

Social Insurance Organization

Social Insurance Agency of Merchants, Artisans and Self-employed

Local and Metropolitan Municipalities

Universities

Federations of Disabled Persons

Other non-governmental Organizations

Media

SECOND AND THIRD YEAR

New projects can be designed for scaling up the pilot regions. The number of the new regions should not succeed five to avoid overdistribution of the financial and human recources. The local units have to make their time – tables and the all the projects will be finishing field work at the end of the third year.

FOURTH AND FIFTH YEAR

Statistical analysis and data proccessing will be done in the first half of the fourth year. The results will be shared with all the stakeholders.

Workshops will be planned for the future disability rehabilitation network in Turkey. The goal will be to establish a development plan for the people with disability. This plan should involve:

All the disability groups (hearing difficulty, seeing difficulty, moving difficulty, learning difficulty,etc.)

Basic health care facilities to all of these groups

Preventive medical rehabilitation services

New structure for the medical rehabilitation network: local community units/ hospitals or small specialized services in the district level /rehabilitation centers in cities

Educational services –inclusively planned

Vocational rehabilitation services integrated to the medical rehabilition

Community participation strategies (in local, district and national levels)

Income generation projects planned in local, district and national levels

Conclusion

Community based rehabilitation have been in existence since many years. In the Joint Position Paper by WHO, ILO and UNESCO in 1994 ; it is defined as “a strategy within community development for the rehabilitation, equalisation of opportunities and social integration of all people with disabilities. CBR is implemented through the combined efforts of disabled people themselves, their families and communities, and the appropriate health, education, vocational and social services”(7). In reality, there may be many contraversial interpretations in the above definition.

The most important issue about CBR is that countries have to generate their own models that is acceptable for their communities.

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L096

COMMUNITY-BASED STROKE REHABILITATION IN JAPAN

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Introduction

With increasing populations of elderly persons throughout the world, we are faced with enormous medical and welfare problems that demand urgent solutions. Among the various causes of disability, stroke poses us one of the most serious health and economic problems. In Japan, for example, stroke ranks third as a cause of death following cancer and heart disease. The annual medical expenses utilized for stroke were estimated as approximately \1,920 billion ($17.46 billion) in 1997, or about 6.6% of the total medical expenses, and 78% of these expenses were used for patients aged 65 years and older. The number of persons left with stroke residuals was estimated as 1.7 million in 1996, and stroke is presumed to have caused about 30% of the bed-ridden population. It is the most frequent cause of disability, accounting for 12.2% of all causes in 1996 followed by bone and joint disease (12.1%) and heart disease (10.0%), and the most frequent reasons for rehabilitation referrals.

Under stringent economic conditions, we must formulate strategies to efficiently allocate the limited medical and welfare resources so that we can enhance the quality of life of persons with disability and at the same time minimize the burden of care to our society. To achieve these goals, it is important to maximize their functioning and lessen their levels of care with appropriate and integrated

rehabilitation intervention from the acute phase through the recovery phase to the maintenance phase in the community. In Japan, together with health insurance plans that cover acute and recovery phase rehabilitation services, a nation-wide public insurance program called the Public Long Term Care Insurance Program was started in 2000 to cover care and rehabilitation needs after finishing active medical treatment. This program is hoped to pave the road for the forthcoming highly aged society

In the so-called "maintenance phase", community-based rehabilitation (CBR) plays an important role. Historically, CBR was first used by World Health Organization (WHO) in 1989 as a new concept that attempts to resolve a long-standing problem of caring the disabled in the community. It can be defined as measures taken at the community level to use and build on resources of the community, including the impaired, the disabled and the handicapped themselves, their families and their communities as a whole.

In the community phase of rehabilitation, we experience clinically that there are three types of patients, i.e., 1) those who have had sufficient rehabilitation intervention and are in need of maintaining the acquired functions; 2) those who were discharged to the community or admitted to long-term care facilities without getting sufficient rehabilitation services; 3) those patients whose once acquired functions have deteriorated with immobilization, worsening of preexisting illness and/or development of new illness. However, the actual conditions of persons with disability in the "maintenance phase" have not been thoroughly investigated.

With the aims of 1) clarifying rehabilitation needs in the "maintenance phase", 2) establishing a screening system to capture these needs in the community settings, and 3) establishing effective intervention methods to meet the needs, we have been engaged in the following studies since 2000: 1) Establishment of an instrument set to evaluate patients' demographics, diseases, impairments, disabilities, handicaps and the kind and amount of services provided to survey their actual conditions; 2) Development and validation of a screening system to detect the so-called "quasi-in-need-of-care" state, i.e., those patients who are in need of care but whose functioning can be improved with appropriate interventions; 3) Planning and execution of efficient and effective intervention programs to improve the "quasi-in-need-of-care" state. A brief description of our research projects will follow.

Survey of the actual conditions in the "maintenance phase"

In 2001 and 2002, we performed a pilot study of the actual conditions of those receiving long-term care services in the community and in long-term care facilities. In addition to demographics, information about diseases and information about the kind and quantity of services provided, we assessed the participants (n=256) using a set of standardized instruments [the Stroke Impairment Assessment Set (SIAS) for patients with stroke, the Functional Independence Measure (FIM), Mini-Mental State Examination (MMSE), Medical Outcome Study Short Form 36 (MOS SF36), Frenchay Activities Index (FAI) and Zarit Burden Interview (ZBI)]. We constructed a database containing these instruments.

In 2003, we revised the schema of the above database, and devised a dataset to facilitate a larger scale survey. We also developed tools to enable easier evaluation of activities daily living (ADL) in the community settings, i.e., "the minimum FIM" or a minimum set of items that can explain original FIM scores well using a multiple regression analysis and "the iFIM" or a scoring system that allows easy scoring of the FIM interactively on the web page.

Using the database and assessment tools developed in this way, we assessed factors related to the "in-need-of-care state" and the possibility of its improvement with appropriate interventions in the community and long-term care facilities nation-wide (1129 cases altogether). As a result, frequently observed problems that were related to the "in-need-of-care state" were gait disturbance, muscle weakness, spasticity, pain, lowered physical fitness, bladder dysfunction and so on. It was also remarkable that these conditions were judged as improvable with appropriate interventions in 65.6% of cases that were not receiving rehabilitation services.

Development of a screening system to screen the "quasi-in-need-of-care state"

Our survey demonstrated that in the so called "maintenance phase", there are cases whose ADL and care burden could be improved with appropriate rehabilitation approaches, or in the "quasi-in-need-of-care state". To screen this condition in the community, we started a project to develop a simple checklist that can be used on the spot by care providers. We need to study the validity, reliability, sensitivity and specificity of the checklist.

Intervention studies

1- Active gait training in health care facilities for the elderly:

To test the effectiveness of an active gait training program for frail elderly persons, we performed gait training assisted by a nurse (mean distance 148 m/day, 4 times/week for 5 weeks) in 11 residents of a health care facility for the elderly who could walk for a short distance but were unsteady and easy to fall down. After the intervention, knee extensor muscle strength measured isometrically with a hand-held dynamometer increased significantly ($p<0.05$) and the care load for mobility activities lessened. Based on this preliminary study, we are planning a larger scale intervention studies.

2- The effectiveness of a regular manual stretching exercise on limited hip abduction in totally dependent patients:

Limited hip abduction often seen in totally dependent patients poses significant care problems. With a randomized control study design (13 in the intervention group and 14 in the control group), we studied the effectiveness of a passive stretching exercise (5 minutes/day, 5 times/week for 4 weeks) on the hip abduction range. After 4 weeks, the hip abduction range improved significantly in the intervention group and care load lessened.

3- The effectiveness of reconditioning hospitalization:

We retrospectively analyzed the FIM score changes before and after reconditioning hospitalization that was indicated by physiatrists in 264 patients with stroke living in the community (mean age 68.0, mean days from stroke onset 957.7). With a mean length of stay of 72.2 days, the FIM score improved from 78.8 to 87.8 ($p<0.0001$). It was demonstrated that ADL can be improved in patients in the so-called "maintenance phase" with appropriate judgment and interventions.

Conclusions

From the above studies, it became apparent that even in the "maintenance phase" that is mostly covered by the Public Long Term Care Insurance Program, there are patients in the "quasi-in-need-of-care state" whose functioning could be improved with appropriate rehabilitative interventions. This would be beneficial not only for the patients and their caregivers but for the society as a whole by lessening the burden and cost of care. We are planning to institute a model system for screening and intervention for the "quasi-in-need-of-care state" in the community and to study its effectiveness.

L097

REHABILITATION PRINCIPLES AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Anterior Cruciate Ligament (ACL) is the most frequently injured knee ligament, accounting for about 50% of all ligament injuries. After an ACL lesion, knee instability is common and may produce progressive functional changes and damage to other joint structures, which may also affect daily life activities.

The goal of ACL reconstruction is to improve the patients level of function, with in the hope of allowing them to return to an active life style, with minimal disability, while protecting from further injury to the knee.

A scientifically based and well-designed rehabilitation program plays a vital role in the functional outcome of the ACL-reconstructed patient. The rehabilitation program should begin, whenever possible, preoperatively and continue there after. The goals of preoperative rehabilitation is to prepare the patient mentally and physically for surgery. After surgery the emphasis of rehabilitation should be on reducing pain, swelling and inflammation; restoring normal Range Of Motion (ROM); regaining quadriceps control; normalizing the gait.

It has been proposed that post-operative pain inhibits normal muscle activity immediately after surgery and is largely responsible for the muscle hypotrophy. By controlling post-operative pain by analgesics and/or anestetics better rehabilitation can be achieved and it also minimizes the catabolism seen after surgery.

Quadriceps muscle atrophy frequently follows ACL injury and surgery. Because this muscle is a fundamental extensor and stabilizer of the knee joint, restoration of quadriceps muscle mass and performance is paramount to successful ACL rehabilitation.

Since the discovery of mechanoreceptors that can detect changes in tension, speed, acceleration, direction of movement, and the position of the knee joint in the human ACL, it has been postulated that information from the ligament assists in dynamic stability of the knee joint. In this respect the loss of proprioception in the ACL deficient knee is well documented and it has been suggested that the lack of full recovery of the knee function after ACL reconstruction is a result of sensory and motor behavior deficits.

Numerous knee-scoring systems have been developed and used to evaluate knee function after ACL injury or reconstruction. The most widely used knee-scoring systems are Lysholm knee scoring scale, Tegner Activity score, Cincinnati Rating system and International Knee Documentation Committee (IKDC) form.

In view of the above considerations PM&R specialists should use their knowledge and back ground to evaluate and track the rehabilitation program of each individual patient separately.

L098

REHABILITATION AFTER HIP ARTHROPLASTY

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Arthroplasty is a replacement of damaged or arthritic surfaces of the joint with materials to restore the integrity of the joint. Most often materials are made of metals and plastics. Arthroplasty is applied on hip, knee, shoulder and elbow joints.

Total Hip Replacement:

Total hip replacement or "arthroplasty" (THA) is the replacement of the femoral component and acetabular component of the hip joint with artificial parts called prostheses. There are two main components used in total hip replacement.

- The femoral component is made of metal and replaces the ball.
- The acetabular component replaces the socket and may be made entirely of a very hard medical-grade plastic called polyethylene.

When conservative methods of treatment fail to provide adequate relief, total hip replacement is considered. More than 180,000 people in the United States undergo hip replacement surgery each year.

The goal of any rehabilitation program following THA is not only to maximize the patient's functional status with respect to mobility and activities of daily living but also to minimize postoperative complications. Right after surgery the range of motion that is safe for new hip is limited. The hip will need special care until it has completely healed. Physiatrist and therapists will work with patients to develop a plan for healing and rehabilitation. This plan will help the patients get stronger and improve their range of motion. They will probably use a walking aid, such as a walker or crutches, after surgery. The Physiatrist will probably prescribe medical therapy and rehabilitation program. Medical therapy and rehabilitation may also prevent deep venous thrombosis.

What to Expect after Surgery: The majority of people experience good to excellent results following hip replacement. This means significant relief of pain and improved functional movement and strength. This enables them to walk, sit, drive a car and cope with the activities of daily life more easily. The life of the replacement is difficult to predict but is generally 12 to 15 years.

Indications and Contraindications: Hip joint replacement is primarily done in people age 60 and older. The operation is usually not recommended for younger people because of the strain they can put on the artificial hip, causing it to fail prematurely.

The reasons for replacing the hip joint include:

Severe pain from arthritis in the hip that limits an individuals' ability to do the things they want to do

s in the elderly of the neck of the femur (usually requires a Fracture hemi-arthroplasty)

Hip joint tumors

This surgery is usually not recommended for:

Very young patients

Current hip infection

People with poor skin coverage around the hip

quadriceps muscles Paralyzed

affecting the hip Nerve disease

Patients with severely limiting mental dysfunction

Serious physical disease (terminal disease, such as metastatic cancer)

Extreme obesity (weight over 135 kg)

Method of fixations: Firm fixation of prosthetic components to the surrounding bone is essential for a pain-free joint. There are four primary methods of fixation. Each one may be used alone, and some may be used in combination with each other. These methods are;

Bone Cement

Bony Ingrowth

Hydroxiapatite Coating

Press-Fit Stabilization

Postoperative Rehabilitation Program:

The specific activities that patients must perform as a part of a therapy program after THA have not changed significantly over the years. Rehabilitation following a THA begins on the first postoperative day. Early in the modern era of THA, patients often spent several days or more in balanced suspension before they were allowed to ambulate. Patients are now taken out of bed, if possible, on the first day after surgery and begin ambulation training no later than the second postoperative day.

In hospital: *Immediately after waking up and for several days after surgery, Breathing and Circulation exercises are important. After the operation, the goal of the rehabilitation is to prepare the patients for discharge by helping them achieve independence as safely and quickly as possible. Exercises are begun as soon as possible after surgery. This may be painful but must be done in order to achieve the best results. Within 2 to 3 days, they will begin to walk with a walker or crutches. They will be taught how to climb stairs before they go home.*

At home: *The average length of stay in hospital following a total hip replacement is about 7 days. Emphasis is on regaining movement of the hip, strengthening the hip muscles, and improving walking. The therapist will help the patients to progress their exercises as they are able. The patients must do the exercises prescribed for them regularly, and gradually increase the frequency and distance of their walks using their walker or crutches.*

Upon returning home, they will resume their normal daily routine, but they may find some tasks difficult to complete. Various equipment may be helpful.

As a conclusion, Total hip arthroplasty is among the most performed and successful of operative procedures, resulting in significant improvements in the patient's quality of life. It is essential for any physician working with these patients to understand all the aspects of care that will optimize their outcome.

L099

FUNCTIONAL RECOVERY AFTER STROKE

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Stroke is the third leading cause of death and the most common cause of adult disability. Approximately 700.000 new or recurrent cases of stroke occur annually and nearly 150.000 die from stroke. However, there are about 3 million stroke survivors with varying degrees of neurological impairment and disability.

The past decade has witnessed siginificant advances in the prevention and treatment of sroke, although stroke remains the most common cause of neurological dysfunction. A recent review of the stroke rehabilitation literature discovered 270 randomized controlled trials (RCT) in this field (1). These trials provide not only a sound foundation for evidence-based practice in stroke rehabilitation but also confirm decades of clinical experience.

One of the most exciting results of sroke research is our increasing understanding of the brain's plasticity and the ability of rehabilitation to improve neurological recovery and subsequently clinical outcome. Basic research on stroke recovery has shown that the recovery process can be modulated through pharmacological and physical interventions.

New Neuroimaging Techniques

Many theories and hypotheses have been suggested to explain the neurological and functional recovery after stroke. It increasingly appears that brain reorganization contributes to functional recovery after stroke or other brain injury. However, much remains to be known about this process, including its stimulus, regulation and limitations. Functional brain imaging has offered a great opportunity to visualize cerebral activation in association with recovery from a stroke. Functional MRI (fMRI), PET, and transcranial magnetic stimulation are now being used to demonstrate activation after stroke associated with specific stimuli or tasks (2). One of the most exciting and dramatic observations to come from human brain mapping is the dynamic plasticity in the brains of patients with stroke.

Functional MRI (fMRI) has not only reduced the cost and invasiveness of functional neuroimaging, but also has increased its sensitivity such that task-specific signal changes can be reliably detected in subjects. One of the major potential clinical applications of fMRI is to gain a better understanding of the mechanisms of functional recovery in response to brain injury. Fundamental question concerning the specific application of fMRI to stroke recovery is the extent to which the normal coupling between neural function and cerebral blood flow (CBF) is preserved, as well as the extent to which changes in CBF with functional activation reflect neural versus vascular reorganisation (3). Better understanding of the relationships between task difficulty, task performance, and brain activation will provide the opportunities to improve functional recovery after stroke. While fMRI has been largely used in research to map brain functions, it is just beginning to find clinical applications.

Evaluating the Recovery and Outcomes of Stroke

Stroke is a difficult disease to study because of its differing etiologies, the heterogenetiy of symptoms, variability in severity and in spontaneous recovery. Stroke recovery reflects three simultaneous and interrelated processes: 1) resolution of acute pathological sequela of stroke, 2) resolution of intrinsic neuroplasticity and 3) behavioral compensation. These three processes often produce recovery patterns in which neurological and functional recovery do not necessarily correlate with one another, i.e., there may be functional recovery without much neurological improvement or vice versa. The time course of neurological recovery tends to follow a pattern similar to functional recovery. However, many patients may experience substantial functional recovery in the presence of major neurological deficits.

Stroke outcomes have been shown to be associated with many factors including size and location of lesion, age and initial functional disability. Initial disability at the time of injury has been shown to be the strongest predictor of stroke outcome. Patients with the most severe stroke will experience the least amount of recovery, individuals with moderate stroke will have the most variability in their recovery and patients with mild deficits have the most recovery.

Overall, the majority of recovery occurs in the first 1-3 months after stroke with continued slower gains over the six months to one year. Although motor recovery may plateau three to six months after stroke, functional recovery may continue for up to several years. The time course of stroke recovery varies with stroke severity and recent sudies have shown that recovery may even occur several years after the stroke has occured. The ability of the brain to maintain performance by recruiting undamaged parts of the cortex may suggest why functional recovery can occur even after large strokes and longer time period. Damage in the white matter is believed to be a key factor in recovery time. The involvement of white matter tracts causes slower and reduced recovery. This may reflect reduced capacity to redistribute workload when the connection through white matter is disrupted.

To date, there is no consensus about what are the "best" health status and outcomes measures to use to reflect the effects of stroke. Due to the limitations in currently available measures of stroke outcomes, two important measures are currently underway to aim to improve our ability to assess patient outcomes after stroke; Stroke Outcome Scale and Stroke Impact Scale.

New trends in Stroke Rehabilitation and Pharmacological Interventions Intensity and specifity of therapy

A common unresolved debate has been the quality and quantity of therapy in stroke patients. Evidence is building that intensity of therapy is important particularly for language recovery (4). Intensive therapy is required to achieve optimal speech outcomes. Although benefit from "intensive therapy" is not as clear for arm function and other functional abilities, evidence from clinical and functional imaging studies suggest that more intense therapy over a shorter period of time provides a better outcome (5). On the other hand, the quality of therapy is equally important. While repetitive training or progressive resistive exercises have been shown to be little beneficial, task specific therapy showed best results (6,7). An excellent example of this is left-sided neglect, where task-specific training (enhanced visual scanning techniques) improves visual neglect with associated improvements in function (5).

Sensory stimulation

The importance of sensory stimulation in stimulating the brain and facilitating recovery has been shown with fMRI. Several modalities of sensory input have been searched and shown to result in dramatic improvements in patients with neglect (8). The concept of sensory stimulation apparently underlies the use of acupuncture and TENS for facilitating motor recovery in recent clinical practice.

Robotic-assisted rehabilitation

Robotic devices provide a tool by which therapists can increase the amount and intensity of movement in the involved extremity, allowing them to spend more time on task-specific and complex functional movements. Krebs et al. suggests that robot-aided sensorimotor training, especially in the upper limbs leads to greater motor recovery and such recovery is sustained over the long-term (9).

Virtual reality and motor imagery

One of the newest potential therapies is virtual reality as a training tool in stroke rehabilitation. Virtual reality is a computer technology that stimulates real-life learning and allows for increased intensity of training while providing augmented sensory feedback. Movements trained in a virtual environment performed by patients with stroke can be generalized to similar real world tasks and to certain types of untrained tasks, producing gains in real world function. This potential for recovery still exists after conventional therapy has been discontinued. Virtual reality is ideally suited for telemedicine-enabled application in patients with impaired mobility or in underserved areas. Another exciting training tool that is being used in rehabilitation is the concept of *motor imagery*. It has been shown that motor imagery can result in increased functional MRI activity and can be used particulary for motor retraining of hemiparetic limbs (5).

Home-based rehabilitation

Early supported discharge, providing interdisciplinary rehabilitation in the home instead of in a hospital, seems to offer the same benefits as in a hospital stroke rehabilitation unit. But this concept has only been tested in a less severely disabled stroke patient population. Although the concept of early supported discharge remains a promising one and not suprisingly reduces the length of hospital stay and cost, many questions are still unanswered. Nevertheless, the trend toward moving stroke rehabilitation into the community faster for certain patients still continues.

A recent Cochrane review reported that care pathways in stroke units actually resulted in significantly lower patient satisfaction and quality of life (10). Hoenig et al. Suggested that structure of care (systemic organization, staffing expertise and availability of technology) was not associated with better functional outcomes whereas compliance with poststroke rehabilitation guidelines improved those same outcomes (11). This apparent paradox may signify the importance of using evidence or guidelines to assist rehabilitation clinicians in individualizing the rehab of stroke patients as opposed to a "one size fits all" approach. On the other hand, the possibility exists that the cessation of recovery after 6 months may be a result of a self-fulfilling prophecy: the clinician's attitude may influence the outcome.

It's long been known that improved social support improves outcomes, and although not studied yet in a formal RCT, the evidence that social support improves has been impressive. Grant et al. in an RCT examining a social problem-solving telephone partnership intervention acquired better problem solving skills, less depression, greater care-giver preparedness and significant gains in social functioning and emotional health (12).

Pharmacological Interventions

Following cerebral ischemia, pharmacological interventions that can improve outcomes have been the focus of considerable attention with limited success in humans despite promising results in animal models. The potential for combination therapy involving nerve growth factors and marrow stromal cells for stroke recovery holds promise for future clinical trials.

- Neuroprotectors (rt-PA)
- Nerve Growth Factors (b-FGF)
- Peripheral Stem Cells (Adult bone marrow stromal cells)
- Dextroamphetamine, levodopa
- Methylphenidate
- Bromocriptine
- Fluoxetine (Prosac)

Despite the explosion of clinical stroke rehabilitation research, there remain many important unanswered questions. The next few years promise to be an exciting time in stroke rehabilitation as we understand the mechanisms of functional recovery and brain's plasticity with the help of new neuroimaging techniques.

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L100

PROPRIOCEPTIVE REHABILITATION IN ORTHOPEDIC DISORDERS

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Proprioception is a specialized variety of the sensory modality of touch and encompasses the sensations of joint motion (kinesthesia) and joint position (joint position sense). Capsilo-ligamentous structures of joints may contain receptors that , along with muscular and cutaneous receptors, provide the basis for a more active mechanism of protective joint restraint and joint position sense. Proprioceptive sensation relies on simultaneous activity of a number of types of afferent receptors that convert mechanical stimuli to neural signals that are transmitted along afferent pathways to multiple levels within the central nervous system (CNS). The CNS functions to integrate these afferent signals and ultimately regulates motor commands controlling voluntary muscle activation for performance of complex motor skills along with involuntary motor responses that contribute to joint stability.

When the structures in a joint are injured, partial deafferantiation may occur with resultant proprioceptive deficits. This damage inhibits normal neuromuscular control resulting in diminished joint

stabilization , altered patterns of locomotion, and ultimately contributing to repetitive injuries and a progressive decline of the joint (1,2).

Proprioceptive information is a critical source of sensory information for optimal and efficient motor performance. It is conveyed to each of motor control centers such as spinal cord, brain stem and cerebral cortex, and the associated motor areas (cerebellum and basal ganglia).

Visual and vestibular information are analyzed by the CNS and play an important role in body position and balance. The sensory receptors for proprioception are located in the skin, joints ligaments, tendons and muscles.They are activated by changes in pressure and movement of soft tissue structures .Their afferent inputs are integrated at all levels of the CNS to generate appropriate motor responses. The control of movement and posture is dependent on a continuous flow of movement and posture is dependent on a continuous flow of sensory information about events in the environment. The motor responses generally fall under three levels of motor control: a) Spinal cord for simple reflexes, b) The lower region for more complicated responses , c) The cerebral cortex for control of the most complicated responses

The assessment of neuromuscular control includes the measurement of cortical, spinal reflex, and brainstem pathways. The evaluation of this complex neuromuscular system as different components allows a more detailed explanation of afferent control mechanisms.

The assesment of proprioception is accomplished by measuring the characteristics that make up the proprioceptive mechanism. There are two major components in proprioception:

1) Joint position sense ,and 2) Kinesthesia.

Testing joint position sense is one method of assessing the afferent pathway of the neuromuscular loop. Actively reproducing a periviously presented joint angle within available range of motion stimulates both joint receptors and muscle receptors. Joint position sense tested actively may better represent joint function than tests performed in the passive test mode.Tests that employ active reproduction of passive positioning (RAP) have been frequently used and are accepted tests of proprioception (1,2) .

Functionally , kinesthesia is measured by establishing the threshold to detection of passive joint motion. In this method, the blind folded subject sits in a chair with the legs supported by an external device. One leg is slowly flexed or extended at a rate of approximately 0.5^0 / sec. The outcome measure is the magnitude of flexion or extension that the leg has moved at the point the subject detects motion of the leg.

The evaluation of reflex capabilities is often assessed by measuringthe latency of muscular activation to involuntary perturbation by electromyographic studies. Functional assessment of the combined peripheral , vestibular, and visual contribulitions to neuromuscular control is best accomplished by the use of balance and postural sway measurements for the lower extremities. The availability of stabilometric methods and instrumentation can provide a relatively accurate index for these measurements.

Some alternative methods to assess the proprioception can be summarized as follows:

1. Isokinetic dynamometers
2. Electrogoniometre
3. Flexometers
4. Balance devices,
5. Postural stability systems.

The sensorimotor control measurement techniques can be organized into the following groups based on the neuromuscular pathways they measure :

1. Single limb postural stability tests
2. Single limb agility tests,
3. Tests of kinesthesia
4. Tests of joint position assessment both as acitve and passive positioning,
5. Tests for the reaction of the peroneal muscles to sudden inversion,
6. Measurements evaluating neurophysiological afferent abilities.
7. Peroneal nerve conduction velocity measurement.

While the importance of proprioception as a clinical outcome measure is becoming well recognized, the best measurument technique is yet to be defined (2,3,4).

So far numerous studies have been carried out to evaluate the role of proprioception in joints. It has been found that damage to articular structures, such as the anterior cruciate ligament (ACL) and meniscus, in addition to ostearthritic changes disrupts articular structures containing mechanoreceptors.

An injury to a joint may cause direct or indirect alterations in sensory information provided by mechanoreceptors. Direct trauma may lead to ligament and capsula tearing, which may rupture the nerve fibers because they have less tensile stre ngth than collagen. An indirect disruption may result from the effects of an effusion or hemarthrosis. Receptors are intact but they provide incorrect information because of the pressure stimulus. Regardless of the mechanism of injury, any damage to muscle spindles, Golgi tendon organs , or joint receptors has a significant impact on function and dynamic joint stability(5).

The proprioception may play a significant role in preventing reinjury and the cause of chronic injuries may be attributed to proprioceptive deficits. These deficits may also contribute to chronic joint disease through a decrease in joint afferents. This phenomen has been observed in subjects with ACL deficiency. After an ACL disruption, it appears that kinesthetic awareness can be partially restored following ACL reconstruction.

Proprioceptive deficits may predispose an athlete to reinjury through decrements in the neuromuscular pathways resulting in the inhibition of complete rehabilitation (3).

Regardless of the mechanism of injury, any damage to muscle spindles, Golgi tendon organs, or joint receptors has a significant impact on function and dynamic joint stability. Mechanoreceptors initiate the afferent loop of proprioceptive feedback to brain and they have important roles in joint position sense as well as in controlling muscle tone and generating reflex response.

On the other hand, proprioception is a very important component of dynamic joint stability. Dynamic joint stability can be defined as the ability of appropriately activated muscles to stabilize a joint. It is the "product" of the proprioceptive system. Ligaments and joint capsule are the key elements in dynamic joint stability. Joint capsule plays a role in so-called "arthrokinetic reflex" too (3,4,5).

Proprioception may be changed by several factors as follows:

*Traumatic, recurrent shoulder instability causes deficits in kinesthesia,

*ACL deficiency causes decrease in reflex hamstring activity and joint position sense,

* Ankle sprains result in decreased ankle kinesthesia and joint position

* Knee joint position sense is decreased in OA

* Knee and PIP joint proprioception is decreased in hypermobility syndrome,

* Knee proprioception is decreased in joint effusion and hemarthrosis,

*Knee and ankle joint position sense is decreased with aging,

* Muscle fatigue decreases shoulder joint proprioception

In order to prevent any loss in proprioception and neuromuscular control of joints, all comprehensive rehabilitation protocols following an orthopedic lesion must be designed to include a proprioceptive component. It must address all three levels of motor control: spinal reflexes, cognitive programming, and brainstem activity.. Such a program is highly recommended to promote dynamic joint stability and functional stability. The objectives of proprioceptive rehabilitation

are to retrain altered pathways to enhance the sensation of joint movements. Incorporationg the three levels of motor control into activites to address proprioceptive deficits should be initiated early during the rehabilitation process.

Proprioceptive programs need to be tailored to the individual patient, but exercises can include balance training, closed –kinetic chain exercises such as the leg pressor single-leg hops, back-strengtheners, and quadruped stabilization. Sport- spesific traing in athletes is also crucial in regaing proprioception(6,7,8,9,10).

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L101

INSTABILITY PROBLEMS OF THE SHOULDER

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The glenohumeral joint is unique in the human body because of its high degree of mobility in all planes balanced with stability. Functional stability of the glenohumeral joint indicates the maintenance of the head of the humerus within the glenoid fossa during shoulder movements. Factors which contribute this stability can be divided as static and dynamic. Dynamic factors consist of shoulder girdle muscles (rotator cuff, scapular rotators, biceps brachii) and propioception. However static factors include soft tissues (ligaments, tendons, rotator cuff), anatomical components (glenoid labrum, articular version), negative intraarticular pressure and adhesion- cohesion factors. The interaction of these factors are complex and each of them have separate roles in the glenohumeral joint stability.

For a normal glenohumeral joint motion some degree of laxity is helpful. Laxity is the passive translation of the humeral head in the glenoid fossa and is asymptomatic. It has a crucial importance in people who are dealing with sport activities. The degree of laxity differs in each individual, and in each side of the body.

On the other hand, instability is the excessive translation of the humeral head in the the glenoid fossa during active shoulder motion causing pain, dysfunction and apprehension. Dysfunction results with the difficulty of using the shoulder in the activities of daily living and sport. Apprehension is the avoidance of arm motions which causes the feeling of dislocation or pain.

Glenohumeral instability may be based on different factors and can be classified in different ways (Table 1).

Table 1. Types of Shoulder Instability

1.Onset
- a. Traumatic
- b. Atraumatic
- c. Repetetive overuse
- d. Voluntary
- e. Involuntary

2. Degree
- a. Dislocation
- b. Subluxation
- c. Apprehension (micro)

3.Direction
- a. Anterior
- b. Posterior
- c. Inferior
- d. Bidectional
  - anterior-inferior
  - posterior- inferior
- e. Multidirectional

4. Frequency
- a. Acute
- b. Recurrent
- c. Fixed

Since the treatment differs greatly according to the type of instability, the characteristics of the pathology must be identified in advance.

Acute Traumatic Dislocations: The most common type of onset is traumatic (85-95%). A force greater than the capsular labral restraints can result with glenohumeral dislocations, mostly in the antero- inferior direction. In the majoritiy of patients with traumatic etiology, an organic pathology such as a Bankart lesion accompanies, the instability is unidirectional and often it requires surgery when recurrence is present. Therefore the acronym TUBS (traumatic, unilateral, Bankart lesion and surgery) or 'torn loose' describes the typical traumatic instability. The presence of the Bankart lesion which is the detachement of the antero-inferior capsulo-labral complex is seen aproximately in 85% of the cases. The incidence in the general population and in young individuals involved in sports are respectively 1.7- 2 % and 7%.

The initial treatment of the acute traumatic dislocation is closed reduction under sedation, local or general anesthesia. Different methods (Stimson, modifid Kocher, Rokwood) can be applied according to the preference of the physician. Following an immobilisation with a sling for 3 to 6 weeks, an appropriate rehabilitation program consisting of ROM and shoulder girdle muscle strenghtening exercises must be introduced. The recurrence rate in young individuals up to 20 years of age performing regularly sport activities is about 95% and less than 10% in patients older than 40.

Atraumatic Dislocations

In the absence of trauma, due to the decompensation of the stabilizing mechanisms instability may occur. General joint laxity is mostly seen, thus leading to a multidirectional, frequently bilateral instability in the glenohumeral joints. Except some selected cases, the type of treatment advised is conservative, including rehabilitation and specific exercises,, thus the acronym: AMBRII (atraumatic,

multidirectional, bilateral, rehabilitation and inferior capsular shift) is used for this pathology.

Direction

45% of all dislocations in the human body occur in the shoulder, and 85% of them are anterior glenohumeral dislocations. Usually injuries that affect the shoulder in abduction, extension, and external rotation result with subcoracoid dislocation, the most common type of anterior dislocations.

The incidence of the excessive posterior translation of the humeral head resulting with the humerus dislocating or subluxating is 2-4 %. They are frequently locked, and in the half of the cases, trauma is the responsible etiologic factor. Strong muscle contractions, by seizure or electrical shock or any force acting in the adducted, internally rotated position may cause posterior dislocation.

Degree

Recurrent instabilities may be presented clinically as dislocation, subluxation or apprehension.Dislocation of the glenohumeral joint is the complete loss of contact of the articular surfaces; In some cases immediate, spontaneous relocation may occur. Subluxation of the glenohumeral joint is usually transient, and is defined as symptomatic translation of the humeral head on the glenoid without complete separation of the articular surfaces. Apprehension is the fear that the shoulder will subluxate or dislocate when moving the joint above a critical degree of range of motion..

Multidirectional Instability

Multidirectional instability of the glenohumeral joint occurs when the humeral head subluxes or dislocates symptomatically in more than one direction (including inferiorly). It is associated with increased translation posterior, anterior, or inferior (creating a 'sulcus sign'). Although many of these patients have an atraumatic onset, it can also have a traumatic, microtraumatic, congenital or neuromuscular etiology. The main pathology is the overall laxity of the joint capsule. It is mostly seen between the ages 15 to 30 ih both gender, and of the patients are performing swimming, gymnastics, and overhead-throwing. Activity reduction, temporary sling use for support, and early rotator cuff strengthening may reduce discomfort. In 20 % of the patients the response to conservervative treatment is poor, and surgery must be considered.

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CONTINUOUS PASSIVE MOBILIZATION OF THE LUMBAR SPINE- A Controlled Randomized Study

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Study Design

A randomized, one center, sham controlled, double blind clinical trial

Objectives

To investigate the relative effectiveness of short term use of an apparatus supplying continuous passive motion mimicking anterior-posterior pelvic tilt mobilizaton to the lower vertebral column in alleviating low back pain.

Summary of Background Data

Literature discussing the relative short term effectiveness of continuous passive motion for low back pain is limited. Few studies have compared therapeutic methods to placebo or sham and none to the best of our knowledge, were double blind studies.

Methods

Patients answering to all the inclusion criteria and none of the exclusion criteria were offered to take part in the study. Consenting patients underwent a pretreatment interview and physical assessment. They were asked to fill out questionnaires comprised of a visual analog pain score, an Oswestry Disability Index and a SF 36 quality of life scale. Patient management consisted of six sessions over an 8 to 10 day period. Patients allocated to the treatment group were treated by the apparatus supplying the continuous passive mobilization while those allocated to the sham group were treated by the same apparatus but with the internal crank-shaft dislodged thus no mobilization was performed. Pain level was assessed using a visual analog scale prior to and approximately half an hour following completion of each treatment session. All patients who completed the treatment were once again physically assessed and asked to fill out the above questionnaires.

Results

A total of 68 patients were recruited. Fifty eight patients successfully completed the trial, of which 32 were randomized to the treatment group and 26 to the placebo group. The two groups had similar demographic and baseline characteristics. The tretment group showed a significant improvement ($p=0.037$) in short term pain relief as assessed by visual analog pain scales compared to the sham group. We did not find any statistically significant difference while assessing the SF-36 and Oswestry Disability index responses obtained at the end of the treatment period.

Conclusion

Our findings show the use of a continuous passive movement apparatus mimicking anterio-posterior pelvic tilt mobilizaton to be a yseful tool in short term allevation of low back pain when compared to sham treatment.

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THE IMPORTANCE OF PHYSICAL ACTIVITY IN OSTEOPOROSIS

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The incidence of osteoporosis is known to increase exponentially after the age of 50 years. In women bone loss accelerates around the menopause. In recent years however, low bone mineral density (BMD) is seen more and more in young adults, as well males as females. In a study we performed on 50 healthy young adults, 56% showed a T-score below -1 SD (16% fulfilled the WHO-criteria of osteoporosis and 40% of osteopenia). The changing life style of young adults, including a lack of physical activity, a lack of exposure to sunshine, low calcium and high caffeine dietary intake, alcoholic beverages, soft drinks, smoking and drugs might at least partially explain these findings. In an attempt to test this hypothesis, BMD values were correlated with physical activity (walking, sports and exercise) and with daily calcium intake. A nearly significant positive correlation with calcium intake ($p=0.058$) and with physical activity ($p=0.073$) was found. However, calcium dietary intake was estimated only semi-quantitatively and retrospectively, and physical activity (type and duration) was very difficult to quantify. Moreover, other influencing factors that might be important were not taken into account (Lissens and Akyuz, 2001 and 2002).

But also other authors have shown the importance of physical activity in the prevention of osteoporosis. Kemper et al. have shown in a fifteen-year longitudinal study in young adults that daily physical activity during adolescence and in the young adult period is significantly related to the BMD at the lumbar spine and femoral neck at age 28 of males and females. In a study by Janz et al. in 2001 physical activity was consistently and positively associated with bone mineral content and BMD in both boys and girls. They found statistically significant associations between physical activity and bone measures during early childhood, well ahead of the onset of peak bone mass, indicating that intervention strategies to increase physical activity in young children could contribute to optimal bone development. Another study showed

that adult female hip bone density reflects teenage sports-exercise patterns but not teenage calcium intake (Lloyd et al., 2000), as they found that the amount of physical activity that distinguishes a primarily sedentary teenager from one who engages in some form of exercise on a nearly daily basis is related to a significant increase in peak hip BMD.

Not only in young adults but also in postmenopausal women and in the elderly population physical activity is important to prevent osteoporosis. Among other studies Iwamoto et al. demonstrated that increased physical activity consisting of daily outdoor walking and gymnastic training can be useful in increasing lumbar BMD in postmenopausal osteoporotic women (Iwamoto et al., 1998). Nguyen et al. showed that adequate dietary calcium intake and maintaining a physically active lifestyle in late decades of life could potentially translate into a reduction in the risk of osteoporosis and hence improve the quality and perhaps quantity of life in the elderly population (Nguyen et al., 2000). Whole body vibration training significantly increases BMD of the hip, suggesting that this training might be useful in the prevention of osteoporosis, mainly in the elderly population, when physical activity becomes limited (Verschueren et al., 2004).

The opposite is seen where there is reduced mechanical loading such as in space flight, spinal cord injury, and stroke, where accelerated bone loss has been reported.

The mechanism by which this takes place is not completely understood. In a study by Rudberg et al. it was seen that serum isoforms of bone alkaline phosphatase increase during physical exercise in women (Rudberg et al., 2000).

Mechanical loading provides an anabolic stimulus for bone. The biological processes involved in bone mechanotransduction are poorly understood. Several pathways are emerging from current research, including membrane ion channels, ATP signaling, and second messengers such as prostaglandins and nitric oxide. Some key molecular targets include the L-type calcium channel, a gadolinium-sensitive stretch-activated channel, purinergic receptors, prostanoid receptors and the parathyroid hormone receptor (Turner and Robling, 2004). Further investigation of the underlying molecular mechanisms might uncover drug targets for osteoporosis in the future.

In conclusion, physical activity is an interesting therapy for the prevention and treatment of bone loss and osteoporosis because it has no adverse side effects, it is low cost, and it confers additional benefits such as postural stability and fall prevention.

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L104

GLUCOCORTICOID INDUCED OSTEOPOROIS

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Glucocorticoid-induced osteoporosis (GIOP) is one of the most devastating complications of protracted glucocorticoid therapy. GIOP is the most common form of drug-induced osteoporosis. Long-term treatment with glucocorticoids leads to a rapid bone loss and to a greater risk of fractures. Glucocorticoids increase bone resorption by stimulating osteoclastogenesis. The most significant effect of glucocorticoids in bone is an inhibition of bone formation. This is because of a decrease in the number of osteoblasts and their function. GIOP is characterized by lower formation and higher resorption than in postmenopausal osteoporosis. These changes are also associated with a more dramatic bone loss caused by a major loss of trabecular connectivity. Glucocorticoids lead to muscle atrophy and decreased muscle strength with negative consequences for bone formation.

Clinically, patients with GIOP develop bone loss in the first few months of glucocorticoid exposure, and modest doses of glucocorticoids increase the risk of fractures of the spine and hip. Virtually all patients receiving glucocorticoids in doses above 5 mg per day loose bone, the amount lost being dependent on the cumulative steroid dose. The risk of fracture is also related to the individual's initial bone density, which in turn reflects race, sex, age, menopausal status, body weight, smoking and the nature of any underlying illness. Bone density measurement and personal fracture history are the best predictors of future fracture risk. Steroid-induced bone loss is reversible, so measures to minimize the systemic steroid dose or to withdraw these drugs altogether should be pursued no matter how long an individual has been using them.

Calcium/vitamin D supplementation is generally used as a first step treatment of GIOP. Alfacalcidol treatment is superior to plain vitamin D in GIOP. Bisphosphonates inhibit bone resorption and prevent and revert the bone loss that follows glucocorticoid exposure. They have been shown to be effective in the prevention of GIOP and associated fractures. Anabolic agents, such as parathyroid hormone, stimulate bone formation and can increase bone mass in GIOP.

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REHABILITATION PRINCIPLES IN OSTEOPOROSIS

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The three stages of rehabilitation; primary (prevention) , secondary (treatment of osteoporsis) and tertiary (treatment and rehabilitation of osteoporotic fractures) rehabilitation should be followed.

- Evaluation of physical ,functional ,social ,psychological and nutritional status and medication use before starting a rehabilitation program is essential.

- A life-long activity and exercise lifestyle,starting in childhood,increases peak bone density and reduces losses of bone mass in later years.
- General principles of therapeutic exercises (weight bearing aerobics ,strengthening, coordination,balance,posture training etc.)should be practiced.
- Training for safe activities of daily living in a safe environment decreases the risk of falls,especially in persons with high risk of osteoporosis.
- Walking and daily activities,like housework,are practical ways to maintain fitness and bone mass in elderly as well as people of any age.
- Avoid long-term immobilization and recommend partial bed rest for the shortest periods possible.
- In patients with acute vertebral fractures the use of corset,back brace or posture training supports reduces the loads on the spine and helps to provide pain relief. Long-term bracing may lead to muscle weakness and deconditioning.
- Effective pain relief (by physical,medical or behavioral techniques) is one of the most important goals of the rehabilitation program. Continuing pain is an indication for kyphoplasty or vertebroplasty.
-Hip protectors may reduce the occurence of hip fractures in elderly individuals at high risk for falls (previous fall, impaired balance,impaired vision,use of medication causing sedation or disorientation).

Summary of National Osteoporosis Foundations (NOF) Physician's Guide to Prevention and Treatment of Osteoporosis

-Evaluate women for the risk of osteoporosis, recommend BMD assessment under age of 65 with one more risk factor and in all women over age 65.
-Advice all patients to obtain adequate calcium (at least 1200 mg/day for men and women over the age of 50 years ,including supplements if necessary) and vitamin D (400 -800 IU/day).
-Advice patients to avoid smoking and keep intake of alcohol moderate (two drinks or fewer per day).
-Initiate therapy in patients with fracture ,or low BMD,or over age 70 with risk factors.

General Nutrition for Osteoporosis Patients

Calcium and vitamin D have been shown to preserve bone mass and to lower hip and other non-vertebral fracture rates in elderly patients.Supplementation with calcium,vitamin D and protein (20 gm/day for 6 months)can favorably affect the recovery following hip fracture. Thus adequate intakes of calcium, vitamin D and protein are an important component in the rehabilitation of patients with fractures.

General Exercise Programs for Osteoporosis Patients

Exercise benefits include:Decreased risk of falling,improved bone mass and strength,increased muscle strength,improved balance,better posture,better ROM,increased flexibility of soft tissues,improved cardiovascular fitness,improved depression and a better quality of life.These benefits should result in a decreased risk of fractures,but evidence from RCT's is lacking.The exercise program has to be condition-specific and safe.Therefore each exercise has 3 levels of difficulty to allow for different starting points and and progression. Principle of progression involves gradual increases in duration,intensity and frequency of the exercises.

Rehabilitation Program Following Osteoporotic Fractures

Hip: Following a hip fracture ,physical therapy and exercises can improve transfers, gait, leg strength, flexibility and balance. A total body exercise program and progressive strengthening is beneficial.It is important to for patients to regain as much mobility and independence as possible following hip fracture. Patients progress from walkers to canes to unaided walking. Especially hip strengthening exercises should be stressed periodically.Reduction of risk of falling,home safety assessment and balance training are other important points.

Vertebra: A basic approach to initial treatment following acute vertebral fracture includes use of analgesic medication,a brief period of partial bed rest(max 4 days)with a few 30-60 minute periods each day of sitting upright and walking to prevent bone and muscle loss.Physical therapy interventions may also be helpful for pain control.

Back supports after vertebral fractures are best used as temporary adjunct to other therapies.They reduce pain by by restricting spinal motion and promote earlier return to full activity.Multiple spinal fractures,with or without neurological symptoms and trunk weakness,are indications for the use of spinal supports.Type of support and duration of use (2-6 weeks)must be individualized to each patient.

Patients with severe pain and weak trunk muscles may benefit from a walker with wheels that allows greater mobility with less pain.The use of a standard walker shoud be avoided.

Loss of height may cause costal-iliac impingement syndrome whic also causes mechanical pain and has to be treated by a soft belt and injections.

Following a vertebral fracture spine extension strength, abdominal strength,shoulder strength, flexibility, balance and posture have to be improved.

Kyphotic posture shold be corrected by application of of a Posture Trainig Support(weighted kypho-orthosis)and specific back extension exercises.

Following vertebral fractures,safe movement is very valuable to minimize loads on the vertebral bodies and reduce the risk of further fractures.Good body mechanics should be taught emphasizing an erect spine and bending at the hips and knees.

Forearm: Following a distal forearm fracture during the cast or bracing stage,arm elevation,early mobilşization and anti-edema control measures should be applied.Rehabilitation usually takes 12 weeks including following steps.Isometric contractions of the forearm muscle group while the arm is immobilized.Active and passive ROM exercises to all joints of the involved extremity,especially the shoulder and elbow.Gradually perform pronation and supination with forearm fully supported;and start progressive resistive exercises and grip strengthening measutres like ball-squeezing.

Fall Prevention

Falls are complex events involving many aspects of the patient's physiological,psychological status,current treatments and environment.Major risk factors for falls include;
a- Medical risk factors (poor vision etc) b- Neuromuscular risk factors (poor balance,weak muscles,kyphosis,reduced proprioception) c- Fear of falling d- Environmental risk factors.Clearly assessing all aspects is key to reducing the risk of falling.

Spinal Orthoses or Braces

Spinal orthoses for osteoporotic patients come in the form of corsets or braces and are designed to support or hold parts of the body in correct alignment. In general, braces have a rigid transverse part while corsets do not.

1) Corsets

a) A lumbosacral corset provides abdominal and lumbosacral support by converting the abdominal cavity into a rigid cylinder using flexible cloth or elastic.

b) A thoracolumbosacral corset is made with shoulder straps to provide hyperextension of the thoracic spine.

2) Braces

a) TLSO: Thoracolumbosacral supports pull the spine into a more anatomically correct position.Examples are;

i. Taylor Brace- a metal and leather brace that restricts flexion and extension and provides hyperextension of the thoracic spine.

ii. Knight- Taylor Brace- same as above with additional restriction of lateral motion.

iii. Jewett Brace- adjustable 3-point hyperextension metal frame brace that hyperextends the thoracic spine without reducing lumbar and thoracic flexion.

c) PTS: Posture Training Support is a device made with shoulder straps that connect above the waist in back where a pouch holds small weights.

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COGNITIVE ASSESSMENT FOR CLINICIANS

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Impairments of cognitive function are a significant cause of disability after brain injury. Cognitive rehabilitation is a systematic service of therapeutical activities and interventions in which patients and their families work with health professionals to restore or compensate for cognitive deficits, thereby improving patient's everyday functioning. The first step in developing a rehabilitation plan is to assess the individual's cognitive status. The goals of this assessment in the context of rehabilitation include the development of an accurate picture of the individual's level of cognitive, emotional, behavioural and social functioning, including areas of spared ability or compensatory strength; individual's capacity for participation in rehabilitation; and suggestions about what will probably be the most effective means to facilitate learning and cognitive functioning.

Cognition is defined as the process of knowing. It includes the discrimination between and selection of relevant information, acquisition of information, understanding and retention, and the expression and application of knowledge in the appropriate situation. Cognitive disability may be seen in reduced efficiency, pace and persistence of functioning, decreased effectiveness in the performance of routine activities of daily living; or failure to adapt novel or problematic situations.

Main areas of cognition include arousal, orientation, attention/concentration, memory, language and communication, calculation, executive functions, and visuospatial perceptual and constructional abilities. Each of these areas should be evaluated in a complete cognitive assessment. Premorbid intellectual functioning of the individual which can often be inferred from educational records, vocational history and the reports of the individual and his family is important to compare with the current intellectual abilities. Besides, assessment of mood, often after brain injury and have great impact on cognitive status. personality and behaviour is essential as emotional lability and behavioural changes are quite

Cognitive assessment must span the WHO-identified domains of impairment, activity limitation, and participation to achieve a comprehensive and contextual perspective. Collaborative assessment involving the individual, the family, and the entire evaluation and treatment team will yield the most integrated and realistic assessment for the purpose of rehabilitation planning.

This presentation will summarize the principles of cognitive assessment following acquired brain injury and will address the methods and psychometric tests used to evaluate each area of cognition.

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COGNITIVE-BEHAVIORAL PROGRAMS IN REHABILITATION

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BRAIN PLASTICITY

Turgay Dalkara, MD

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THE CRANIOSACRAL THERAPY

Gadi Nellinger, MD

For merely 25 years, osteopathic physician and searcher, Dr. John E. Upledger, has been proponent to using the rhythm of the CranioSacral system to enhance body functioning and help alleviate pain and dysfunction

The CranioSacral system consists of the membranes and the cerebrospinal fluid that surround and protects the brain and the spinal cord. It extends from the bones of the skull, face and mouth, which makes up the cranium, down to the sacrum or tailbone area. Since this vital system influences the development and performance of the brain and spinal cord an imbalance or restriction in it could potentially cause any number of sensory, motor or neurological disabilities.

CranioSacral therapy is a gentle method of detection and correction that encourages the own natural healing mechanisms to dissipate these negative effects of stress on the central nervous system.

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UNDERSTANDING MUSCULOSKELETAL DYSFUNCTION

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Musculoskeletal system is expected to function ideally for the people who are living in different conditions and jobs also it's never expected to cause a problem.

When these expectances do not happen, a musculoskeletal dysfunction occurs.

A) Although dysfunctions can usually be detected by x-ray, MRI, US, Synthigraphy...etc (as a bone fracture, subluxation, muscle sprain, strain, tendonitis, bursitis...etc), sometimes different lesions under different circumstances can cause it to be identified as different problems. (The pain feeling and functions of a man under great care, are supposed to be different than the one who is in the army.)

B) Even though a simple reason such as those can be proved, it's hard to find the reason for its clinical variations. (Sometimes a patient can move easily and painlessly with severe osteoarthritis, a patient can have difficulties in moving with only a little degeneration.

C) In some cases there are problems with the movement of the patient without a visualized ***(detected)*** pathology. When this happens we must act based on not completely proved thoughts and theories to find a reason for this problem. (Myofascial pain, psychological situation, fibromyalgia, pain threshold, endogen opiate release, endocrine nodal dysfunction... etc)

These different clinical pictures can't always be explained by the patient's psychological mood or by known theories. All these different pictures have one common part which is the dysfunction of musculoskeletal system. Clinically proven swelling, temperature, and body shape disorders ….. Are the detectable signs ***by a doctor,*** but the real problem for the ***patients is the feeling of pain and restrictions*** in movement. ***So we must accept organic disorder and musculoskeletal dysfunction affect one another but in fact they are different problems***. There are many dysfunction theories and they all have strong evidences. About these theories and clinical findings, I will conclude myofascial pain syndrome as an example.

According to Travell, the reason of Myofascial dysfunction is "Algetic agents, which are collected between myofibrils because of many different reasons, happens of Trigger Points. (The red hot spots in the Infrared Thermograph). It's said that nosiseptive impulses which comes from these points can be activated even by the simplest of impulses such as cold, nervousness, anger…etc and cause serious muscle spasms. Because of this reason, using needles on the trigger points and turning them, washing those points with serum physiologic solution, local lidocaine and _or lidocaine like medicaments and make the skin cold enough to activate the gait-control mechanisms, to stretch the wanted muscle or sometimes to heal the trigger points by Ultrasound, electrotherapy, exercise, massage.

Manual Medicine Studies believes in, trigger points occurs because of the restricted moves of the joints. With the right examination methods, dysfunctions in the muscle joint can be located. Muscle spasm, could be healed by using the right maneuvers on the dysfunctional joint-muscle segment. Manual Medicine Studies have some theories about how to explain musculoskeletal dysfunction. Levitt observed joint dysfunctions can't be healed even though they inject the curare, so he believes dysfunction should be searched in the intra-joint problems. Neumann believes that, Wide Dynamic Range Neurons are activated because of faulty movements and uncomfortable positions, which affect either autonomic nervous system or musculoskeletal system in means of segmental joint dysfunction. And because of this myofascial pain goes on; support that because of segmental joint dysfunction stop the activation of WDR neuron the pain cure.

Mitchell thinks that muscle energy techniques are effective for myofascial pain. Wall and Melzac says that there are lots of cure and effecting ways to force the gate control mechanism and endogen opiate releasing. People who use cognitive-behavioral cure say that increasing pain threshold are effective for lots of myofascial dysfunction curement.

In conclusion, a good examination and to interrogate of the reasons and mechanisms of musculoskeletal dysfunction is essential for understanding musculoskeletal dysfunction.

ıS1

RESEARCH AND EXCHANGE PROGRAMS IN THE MEDITERRANEAN AREA – IS IT POSSIBLE?

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The Mediterranean basin is a well defined geographical region where in spite of cultural, religious and other differences, a sense of geo-political unity exists and this is also the case for rehabilitation professionals in the region. Notwithstanding obvious barriers that exist at the moment, the opportunity for exchange programs in teaching and research seem to be at reach and some of them have been already performed.

Israeli rehabilitation has advanced at the different levels of activity and may offerteaching in general issues such as: curriculum for physical and rehabilitation medicine (PR&M), 3-yearly continuing medical education in PR&M program (our program served as basis for the recommendation of a Vice-Dean's Committee for CME at the Tel-Aviv University), PR&M examination mechanism (part "A", part "B"), exposure to everyday clinical rehabilitation activities, running a multi-disciplinary rehab team, management of rehabilitation facilities, departmental computerized data base, rehabilitation day-hospitals, community-based rehabilitation (CBR), the National Rehabilitation Council model, etc. or specific, such: post brain insult cognitive assessment and rehabilitation, orthotics and prosthetics, gait & motor analysis, balance assessment & training, hand functional electrical stimulation (FES), car accidents minimal brain damage in youth, functional disability scales, disability evaluation and determination, the use of advanced technology in rehabilitation, the place of complementary medicine in rehabilitation programs, etc.

Research projects should preferently concentrate on common problems in our area such as incidence and prevalence of frequent diseases: stroke, traumatic brain injury, spinal cord injury, car accidents, the continuum of care, community services.

The way of financing al these can come from governmental factors such the Ministry of Health, Ministry of Foreign affairs Department of International Relations (Mashav), Ministry of Sciences at the national level of the EU Research Authority at the European level. It makes sense to start with 1-2 projects in each category.

The creation of a Mediterranean PR&M Summer school on a mobile basis or permanent if possible (Malta?), could provide basis for budget search for the programmed activities and probably will allow us to campaign for this cause in the EU realm, the World Rehabilitation Fund, WHO, CIRRIE, etc. Some links already exist, for other purposes and may provide some solutions for our aims.

FORMATIVE AND RESEARCH PROGRAM AT THE INSTITUT GUTTMANN: OPPORTUNITIES TO COOPERATE.

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The outcome in neurorehabilitation is one of the factors that have taken biggest advantage, in the last 50 years, from the creation of multidisciplinary teams. This has allowed not only the rise up of new therapeutic possibilities and new techniques but also the naissance of a new field of knowledge. Although the amazing increment in the number of publication in the last decade, many problems remain still unsolved.

So, the creation of "research institutes" and "reference centers" will became critical in the following years to incorporate new advances as well as to promote the creation of new knowledge. The question about if neurorehabilitation is becoming a new specialty within Physical medicine and rehabilitation is more and more clear, as the degree of expertise increases. As a reference center and institute affiliated to the university, we have by mission to develop the academic, scientific and research related aspects within neuroscience in general, and more concretely to neurorehabilitation and applied technologies to disabilities. From the "Institut Guttmann" we respond to this challenge through the development of our Formative Program, as well as with our Strategic Research Plan.

Our formative program is aimed to provide training to specialists in the field of neurorehabilitation at four levels: **Resident's training**, addressed to residents in physical medicine and rehabilitation, Urology and Neurology, who are interested in to know the basis of multidisciplinary treatment in this field; **Pos-graduate program**, addressed to all professionals related with neurorehabilitation interested in achieve the specific and necessary knowledge to participate in this multidisciplinary teams; **Master in neurorehabilitation** focused in that aspects that will qualify professionals to transmit and generate knowledge, taking as working paradigm the scientific method in clinical research; and, finally, the **Fellowship in brain damage** and the **Fellowship in spinal cord injury**, with the final aim of enable specialist for the leadership of interdisciplinary groups and to export this clinical model to other centers.

European community has focused during last years in to create a common space for higher education. As a result of these efforts there is a proposal on the European Credits Transfer System to facilitate international competitiveness, mobility and employability. We believe in the necessity of international cooperation to increase multidisciplinarity and to improve transference of knowledge, so we consider necessary the conversion of local programs into the ECTS as the first step to facilitate the mobility of our professionals.

As well as the management and transmission of knowledge become essential to improve the quality of the provided care; clinical research become critical to translate into clinic the most recent advances as well to guide basic research to respond the question that remain unsolved.

Our Strategic research plant is developed through six main areas of research focused on: 1) Brain plasticity, 2)Neurorehabilitation of spinal cord injury, 3) Neuro-stimulation, neuro-modulation and neuro-prosthesis, 4) Neurorehabilitation of digestive motility, 5) Neuropsychological rehabilitation, 6) Psychological and social aspects of the neurorehabilitation.

Sustainability of these programs is conditioned to achieve funding that cover the additional cost of researchers and complementary techniques. Frameworks programs and regional actions, established by the EU, are setup in such a way that favors multidisciplinary projects and teams. Engineers and other scientist had taken necessities and unsolved questions, in neurorehabilitation, as platforms through which develop their research. This model should be taken by neurorehabilitation, playing a more directive role in this calls and engage engineers in their teams to exploit all the available resources for international cooperation.

INTERNATIONAL CHANGES AND COLLABORATION IN PRM RESEARCH IN MEDITERRANEAN BASIN

Alessandro Giustini – Italian PRM Society

Research activities in Physical Medicine and Rehabilitation are fast-growing every year in Italy, as in other Countries where this branch of learning is evolving, based on disabled persons' needs and on the important results of basic research in the biological-functional and technological field.

For the peculiar nature (more than other disciplines) these two almost joint branches drive those innovations that PRM can positively introduce in care activities to optimize the " **individual outcome**".

*In these fields physiatric research has grown in Italy, by the strategy of a strong activity applied to the clinical practice, considering on the one hand the EBM parameters applied to rehabilitation, on the other hand the peculiar even individualcharacteristics that activities for recovery and attendance must own. So we worked to define new strategies: as the pharmacological treatments of pain, spasticity, cognitive functions and sphincters control, as treatments with equipements for equilibrium, for motor coordination, for posture and nutrition in seriously ill patients, as well as treatments with functional training for walk, for postural changes and occupational daily activities. The other reasearch has been done in the methodological and organizational field: both for multi-professional Team practical aspects led by the Physiatrist for the Individual Rehabilitative Project management and for the organization of many rehabilitation local structures (who does what in Hospital in acute phase, who in post-acute phase and where, when, whic aims etc.), and for the creation of an excellent rehabilitative "*net*" for rare and serious cases, which need heavy investments and lasting cares (as medullar lesion, serious brain injuries, neuromuscolar diseases etc.).*

Moreover we studied the effectiveness and aims of treatments, often very prolonged, for critical disabilities coming from chronical cardio-vascular diseases (decompensation, transplantation) from respiratory diseases (respiratory insufficiency), from oncologic diseases or serious surgical events.

In the end we went on with the traditional task of Physiatry in finding out new applications for physical energies in the symptoms treatment (pain, edema etc.) or in functional recovery and in the traditional aim to innovate in technical aids for autonomy.

We believe that an international Mediterranean coordination in these fields of research could develop the information and observation perspectives of all Centres and researchers and could help the rapidity of results take-over of those Countries that only recently are approaching the Rehabilitation, making use of experience of others (who could themselves benefit from the widening case histories to study). To do all this it's necessary to define the clear priorities reflecting the epidemiological interests of all Basin: to fix a research set and an important aim towards which direct all resources.

EXCHANGE AND RESEARCH PROGRAMS IN THE MEDITERRANEAN

Xanthi Michail, MD, PhD Rehabilitation Specialist

The main aim of exchange programs in the Mediterranean basin is to encourage collaboration between rehabilitation researchers in the member countries.

Planning and conducting research, lecturing, technical assistance, and conference presentations and attendance are some of the forms of collaboration for which funds must be provided.

The first important priority is to collect and disseminate information on international rehabilitation research and practices. Then through organized programs the Mediterranean forum will assist researchers with proposal writing and exchange opportunities and will help service providers regarding the cultural needs of recipient populations.

An important research program in the Mediterranean must target to encourage independent living and community integration, to achieve more successful outcomes for people with disabilities, and to foster the development of innovative methods to achieve these outcomes and to measure achievement.
A specific proposal with great interest for rural areas in the Mediterranean countries could be Telerehabilitation, a new field that probes the possibilities multimedia communications and virtual reality technologies hold for extending rehab services to people for whom they are not available under the traditional, face-to-face service delivery model.

SUGGESTIONS FOR EXCHANGE PROGRAM

Tarek S. Shafshak, MD
Professor at the Department of Physical Medicine,
Rheumatology & Rehabilitation
Faculty of Medicine, Alexandria University, Egypt

The exchange of PM&R trainee between Mediterranean countries is a very good idea. It is beneficial for expanding & increasing the trainee clinical experience. It will be a very good opportunity for trainee from Egypt to receive part of their training program in European countries. Also, the exchange of visits between physiatrists from different countries can improve their knowledge about the available rehabilitation facilities in the other countries. However, in my opinion, this can be attained through official protocols between European universities (or medical centres) and Egyptian universities or the Egyptian Ministry of Health. Therefore, it will be very important that European and Mediterranean universities (or medical centres) tell us what they can offer to make this exchange program possible. Also, I suggest that the ISPRM or the Mediterranean forum of PRM might play a role in the communications between different countries; and in the arrangement for the financial support for trainee (or research workers). I hope if they can help us in establishing an international rehabilitation center in Egypt that might be a good place for offering rehabilitation services and training program not only for Egyptian, but also for trainee from other Mediterranean and African countries. Regarding, topics for regional research, I suggest that running a research which might help in setting a standard protocol for the physical management of facial palsy; and starting a research for improving the outcome of stroke rehabilitation would be very important.

RESEARCH AND EXCHANGE PROGRAMS OF TRAINEES IN PM&R IN THE MEDITERRANEAN COUNTRIES

Gunes Yavuzer, MD,
Ankara University Medical School, Department of PM&R, Turkey
Onder Kayhan, MD,
Marmara University Medical School, Department of PM&R, Turkey

Development of research capabilities is very important to our field's academic future. Physiatric research should investigate and demonstrate, using evidence based methods, that the treatments we offer are clinically effective and cost-effective. Mediterranean Forum should encourage physiatrists to investigate research possibilities and resources in their countries and the collaboration with other Mediterranean Countries. A Research Committee, including voluntary national representatives of all Mediterranean countries, under the auspices and financial support of Mediterranean Forum may be founded in this Congress. This Committee may enable the communication among members, work on principles and rules for applications, evaluate the research project proposals, control the grants, etc. Funding may be provided from the Congress budgets (a constant percentage for research). Applications may be evaluated according to the number of physiatrists working actively at the country; the applicants from the hosting country of the Congress which financially supports research, may get additional points for their projects, etc, in order to be fair.
Exchange program of trainees will also be discussed in this session to foster international exchange on education and research issues in PM&R. Voluntary PM&R Institutions in the Mediterranean Countries may participate to the program. The objectives of the program can be listed as: to support resident and faculty educational trips to other respective institutions; to develop common educational programs for students and PM&R residents; to develop joint research projects studying ethnic diversity in the rehabilitation field. The program (2-4 weeks) may offer a unique clinical exposure related to the care of persons with acute and chronic disabilities for comprehensive rehabilitation. The trainees may receive intensive training in the state of the art rehabilitation, participate in the respective assessment clinic, visit training sites including inpatient and outpatient facilities, common ideas may be shared and potential collaborative research projects may be explored. The trainees may make a formal presentation to faculty and staff, and present the research project that they are participating or developing. There may be ongoing didactic and in-service efforts directed at the third or fourth year PM&R residents. Program should be created in clinical areas that are developing special or added qualifications, wherever possible, so that the trainees become eligible for certification as result of their training. Program should also be accredited by the National PM&R Society and/or Board. A Committee, including voluntary national representatives of the Mediterranean Countries, may coordinate the applications and financing. Committee members may prepare some reports in terms of their country's resources and expectations using surveys. The main problem for this program would be funding. Transfer and housing of the trainees may be covered under some fellowship awards sponsored by the Mediterranean Forum. Accommodation can be offered by the hosting institution, where possible.
We can form the Research Committee and Exchange Committee in this session, work on the responsibilities and authorization. Each Committee can perform their first meeting and elect their presidents, whom would be responsible for all communication among the members and also to the Forum. There are a long way ahead of us and lots of things to do in terms of better education and research on rehabilitation.

IS2

MAIN PROBLEMS AFFECTING REHABILITATION SERVICES IN THE MEDITERRANEAN AREA

Nicolas Christodoulou / Gulseren Akyuz.

Introductory: Nicolas Christodoulou (President of MFPRM).
The aim of this session is to give the opportunity to the delegates of the Mediterranean countries (members of MFPRM) to present the main problems in their country, which affect the proper implementation and creation of the Rehabilitation Services. By collecting all these similar or different problems between the countries, our Society (MFPRM) will be able to decide how to proceed for helping national PRM societies, individual PRM specialists and governments interested for further development of Medical Rehabilitation Services in their own country. A

questionnaire was sent to selected colleagues from all member-countries containing general structural questions as well as questions for the main rehabilitation problems. All the answers received before the circulation of this book follow:

1. ITALY (Alessandro Giustini)

MPR 1. Name of the specialty:
200 2. Number of PRM specialists: in training:
in practice: 2500
4 Per 100000 inhabitants:
Inhabitants: 60.000.000
300.000 3. Total number of physicians:
0,9% 4. Percentage PRM specialists: at present:
desirable: 1,5%
(20%), 5. Methods to practice: 1. Private practice: a. Full time:
(0%), b. Part time:
(80%), 2. Salaried practice: a. Full time:
(0%). b. Part time:
6. General terms of PRM practice in your country:
Total number of Rehabilitation beds: at present: ---desirable:--- .a
General Rehabilitation Centers (No. & which): --- .b
Rehabilitation Centers focused on special PRM branches .c
(No. & which): ---
7. Education and Training:
No. of Medical Schools where PRM specialty is offered: 26 .1
Educational PRM manpower: .2
Others:2nd class 30 Professors:16 1st class
Duration of PRM Education and training: .3
5 years beginning in 2005
Is there a session of PRM education during .4
the pre-graduating period? NO
8. Man power – Future of the specialty:
Pyramid of specialists' ages: More than 60 years old: .A
5% , 50-60: 30%,
40-50: 35% , less than 40 years old: 30%
Man power in the specialty .B
in 2004: 2500, in 2014: 4000 .
Do you have adequate number of professionals for .8
Rehabilitation Team members?
No. of Physiotherapists: .a
present:15.000 desirable: 10.000
No. of Occupational Therapists: .b
present:1.000 desirable: 15.000
No. of Speech Therapists: .c
present:2.000 desirable: 4.000
No. of Clinical Psychologists: .d
present:15.000 desirable: 20.000
No. of Social Workers: .e
present:6.000 desirable: 10.000
No. of Prosthetists / Orthotists: .f
present:1.000 desirable: 1.000
10.Continuing Medical Education (C.M.E./C.P.D.) in our specialty.
a. Society's Program: YES;
in National Health Service Compulsory
Educational Resources for PRM: .b
By National Health Services and private Companies
11. Problems of collaboration between Government or National Health Insurance
Authorities and PRM Society, PRM Foundations etc. : We need to insert more concrete activities into years of information in university: now our colleagues must solve this problem by themselves after university in some Hospitals or Rehabilitation Centres or by Society and his activities (occupational therapy, technical AIDS , Neurorehabilitation)
12. PRM Instruments or devices in the country: considered enough? **YES**
13. How the "Mediterranean Forum of PRM" could help for the solution of the main problems affecting the specialty in your country? Only by more cultural changes.
14. How your "country" (PRM Society) could help for the solution of the main problems, which affect the Rehabilitation Services in other Mediterranean countries through the "Mediterranean Forum of PRM"? By the same changes and making a real "net" also in political and socio-ethical field aiming to develope financing (public and private when possible) in Rehabilitation activities
15. Any other recommendations? We could present, working togheter but in different geographical location, our activities and our aims to our Governments to supply international collaboration.

2. CROATIA (Katarina Sekelj – Kauzlaric)

1. Name of the specialty: "Physical medicine and rehabilitation"
in practice: 299 Number of PRM specialists: in training: 43 .2
Inhabitants: 4 381 352 Per 100000 inhabitants: 6,9
3. Total number of physicians: 13 855
4. Percentage PRM specialists: at present: 4,7 %
(of all specialists)
desirable: 4%
(12 %), 5. Methods to practice: 1. Private practice: a. Full time: 35
(0 %), b. Part time: 0
2. Salaried practice: a. Full time: 203(68 %),
(0 %). b. Part time: 0
(it is not allowed)
6. General terms of PRM practice in your country:
Total number of Rehabilitation beds: at present: 1900
desirable: 1200
General Rehabilitation Centers (No. & which): 12
Rehabilitation Centers focused on special PRM branches
(No. & which): 5
(For rehabilitation of SCI, for brain injury, for amputees, for neurological diseases and for rehabilitation after trauma)
7. Education and Training:
No. of Medical Schools where PRM specialty is offered: 3 .1
Educational PRM manpower: Professors: 5 Others: 30 .2
Duration of PRM Education and training: 48 months .3
Is there a session of PRM education during the pre-grad. .4
Period? YES
8. Man power – Future of the specialty:
Pyramid of specialists' ages: More than 60 years old: .A
21 % , 50-60: 46 %, 40-50: 24 %, less than 40 years old: 9%

B. Man power in the specialty in 2004: 385 , in 2014: 290

The number of 385 is total number of PRM specialists, but only 299 is working as physicians in practice, other are unemployed, working in pharmaceutical comp, in education system.
9. Do you have adequate number of professionals for Rehabilitation Team members?
There are no data on national level for these Team members, but we think that the number is adequate, for now.
10.Continuing Medical Education (C.M.E./C.P.D.) in our specialty.
a. Society's Program: YES
b. Educational Resources for PRM: YES
11. Problems of collaboration between Government or National Health Insurance
Authorities and PRM Society, PRM Foundations etc.

Problem is that our National Health Insurance system haven ´ t enough money for all rehabilitation programs. But on the other side, our law does not allow private insurance to develop.

12. PRM Instruments or devices in the country: considered enough? YES.

13. How the "Mediterranean Forum of PRM" could help for the solution of the main problems affecting the specialty in your country?

To compare conditions in other Mediterranean countries with ours.

14. How your "country" (PRM Society) could help for the solution of the main problems, which affect the Rehabilitation Services in other Mediterranean countries through the "Mediterranean Forum of PRM"?

We can help by our experience in some special rehabilitation programs and by our very big experience in "war rehabilitation".

3. TURKEY (Dr. Hakan Gündüz)

Marmara University School of Medicine
Department of Physical Medicine and Rehabilitation

It is very difficult to assess the rehabilitation services in Turkey like in many Mediterranean countries. It is obvious that, criteria about rehabilitation asssessment, follow-up, patient satisfaction, and patient-physician relationships are complicated. That's why it will be useful for each country to determine the factors which constitute their own rehabilitation conditions.

In our country, the name of the specialization is PHYSICAL MEDICINE AND REHABILITATION (PMR).

Due to Ministery of Health 2003 statistics, there are 936 PMR specialists in Turkish Republic. The overall population of Turkey is 70.877.000 inhabitants where 93.200 general practitioners and specialists work for providing health care. The percentage of PMR specialist to overall physicians is 1% and there is 1.32 PMR specialist in every 100.000 inhabitants.

7% (68/936) of PMR specialists are in private practice and the 93% (868/936) of them work with salaried practice in state hospitals, medicine faculties, private hospitals and e.t.c.

The total number of rehabilitation beds is 5410 and this is about 3% of all bed capacity in all over the country. There are 16 general rehabilitation centers in Turkey. We can not reach the exact number of special focused rehabilitation centers as pediatric rehabilitation. The mean occupancy ratio and hospitalization duration of these 16 rehabilitation centers are at the second place after psychiatry clinics. Unfortunately we do not have any information about the exact number of private rehabilitation clinics.

To our knowledge there are 36 medical schools and 12 training and research hospitals providing PMR education. The total number of educational manpower of these faculties are; 66 professors, 59 associate proffesors, 50 assistant professors and 30 specialists. In training and research hospitals there are 20 chiefs, 25 assistant chiefs, and 82 specialists. The PMR education and training duration is 5 years in Turkey. In the medical schools, PMR education clerkships are mostly elective. It is nearly impossible to give information about specilalists' ages because of inadequate data, and to reach the exact number of PMR residents at present and in the future. So we can say nothing about the expected PMR specialist number in 2014.

In Turkey 865 pysiotherapists, 509 psychologists, and 480 social workers work officially according to Ministery of Health Database and there are 100 physical therapy technicians which may include prosthetists/orthotists and there are not occupational therapist and speech therapist.

In conclusion the occupancy and hospitalization durations show that there are still requirements for PMR specialists and well-organized rehabilitation centers which focus on special PMR subbranches in our country. In order to achieve these goals, besides training new specialists, we should provide the education of rehabilitation team members such as occupational therapists, speech therapists, and swallowing therapists.

4. SLOVENIA (Crt Marincek)

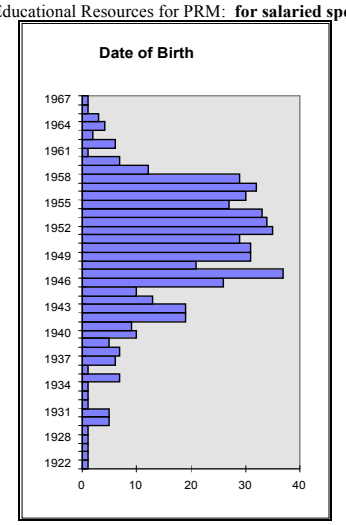
1. Name of the specialty: **Physical and Rehabilitation Medicine**
2. Number of PRM specialists: **3,6**
in practice: **75** **11** in training:
Inhabitants: **2.000.000** Per 100000 inhabitants:
3. Total number of physicians: **4540**
4. Percentage PRM specialists: at present: **2,7%** desirable: **3%**
(**10** %), 5. Methods to practice: 1. Private practice: a. Full time:
(%), b. Part time:
(**90** %), 2. Salaried practice: a. Full time:
(%). b. Part time:
6. General terms of PRM practice in your country:
Total number of Rehabilitation beds: at present: **200** desirable:
General Rehabilitation Centers (No. & which):
Rehabilitation Centers focused on special PRM branches
(No. & which): 1 Institute for Rehabilitation, Ljubljana
7. Education and Training:
No. of Medical Schools where PRM specialty is offered: **1**
Others: **7** Educational PRM manpower: Professors: **3**
Duration of PRM Education and training: **5 yrs**
Is there a session of PRM education during the pre-graduating period?
8. Man power – Future of the specialty:
A. Pyramid of specialists' ages: More than 60 years old:, 50-60: **22**,
40-50: **35**, less than 40 years old: **18**
B. Man power in the specialty in 2004: **75**, in 2014: **82**.
9. Do you have adequate number of professionals for Rehabilitation Team members?
desirable: a. No. of Physiotherapists: present: 900
present: 400 desirable: b. No. of Occupational Therapists:
desirable: c. No. of Speech Therapists: present: 10
desirable: d. No. of Clinical Psychologists: present: 12
desirable: present: 20 e. No. of Social Workers:
desirable: f. No. of Prosthetists / Orthotists: present: 40
10.Continuing Medical Education (C.M.E./C.P.D.) in our specialty.
a. Society's Program: Credit point system
b. Educational Resources for PRM: European Board for PRM
11. Problems of collaboration between Government or National Health Insurance
Authorities and PRM Society, PRM Foundations etc.: as for other specialities

5. FRANCE (Alain Delarque)

1. Name of the specialty: Médecine Physique et de Réadaptation
2. Number of PRM specialists:
in practice: **1916** in training:
Per 100000 inhabitants: **3,2/Inhabitants**
3. Total number of physicians: **205437**
desirable: 4. Percentage PRM specialists: at present:**0.93%**
5. Methods to practice:
1. Private practice: **37%**
2. Salaried practice: **63 %**
6. General terms of PRM practice in your country:
Total number of Rehabilitation beds: at present:--- desirable: ---
General Rehabilitation Centers (No. & which):---
Rehabilitation Centers focused on special PRM branches
(No. & which):---
7. Education and Training:
No. of Medical Schools where PRM specialty is offered:
nearly all the French Medical Schools
Others: Educational PRM manpower: Professors: **50**

Duration of PRM Education and training: **4 years**
Is there a session of PRM education during the pre-graduating period?

"Handicap session" mandatory in all the medical schools
20 teaching hours
8. Man power – Future of the specialty:
Do you have adequate number of professionals for .9
Rehabilitation Team members?
No. of Physiotherapists: **there are difficulties for recruiting PT**
10.Continuing Medical Education (C.M.E./C.P.D.) in our specialty.
Society's Program: **national organisation ASFORRED,**
President Pr JM VITON
Educational Resources for PRM: **for salaried specialists**



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6. ROMANIA (Mihail Berteanu)
1. Name of the specialty: Rehabilitation, Physical Medicine and Balneology
120 2. Number of PRM specialists: in training: in practice: 700
Inhabitants: 22 million Per 100000 inhabitants: 3
3. Total number of physicians: 47.000
desirable: 1,5% 4. Percentage PRM specialists: at present: 1,5%
(5-7%), 5. Methods to practice: 1. Private practice: a. Full time:
(25%), b. Part time:
(98%), 2. Salaried practice: a. Full time:
(2%). b. Part time:
6. General terms of PRM practice in your country:
Total number of Rehabilitation beds: at present:
desirable: 5000 (3000 beds in spas) 4300 (2000 beds in spas)
General Rehabilitation Centers (No.&which):
18 mixed pathology
Rehabilitation Centers focused on special PRM branches
(No. & which): very few: SCI 1 center, children rehab 6 centers.
7. Education and Training:
No. of Medical Schools where PRM specialty is offered: 11
Others: 75 Educational PRM manpower: Professors: 16
Duration of PRM Education and training: 5 years of residency.
Is there a session of PRM education during the pre-graduating period? Yes, 16 hours of PRM in the 5-th year of medical school.
8. Man power – Future of the specialty:
A. Pyramid of specialists' ages:
More than 60 years old: 25%, 50-60: 20%,
40-50: 20%, less than 40 years old: 35%
B. Man power in the specialty in 2004: 820 incl. residents,
in 2014: 900.
9. Do you have adequate number of professionals for Rehabilitation Team members?
a. No. of Physiotherapists: present: 600 most are unemployed
desirable: 450-500
b. No. of Occupational Therapists: present: 0. On 2005 the first
desirable: difficult to estimate OT-s will graduate,
c. No. of Speech Therapists: present: not integrated in the rehab team
desirable: 1/team
d. No. of Clinical Psychologists:
present: not integrated in the rehab team
desirable:1/team
desirable: >300 present: 50 e. No. of Social Workers:
desirable: 100 f. No. of Prosthetists/Orthotists: present: 20
10.Continuing Medical Education (C.M.E./C.P.D.) in our specialty.
a. Society's Program: in association with Universities & the College of Physicians
b. Educational Resources for PRM: no Romanian textbook of PRM
11. Problems of collaboration between Government or National Health Insurance
Authorities and PRM Society, PRM Foundations etc.
PRM has low political impact, despite the fact that in interpersonal relations its importance is recognized.
12. PRM Instruments or devices in the country: considered enough? NO
Difficulties in obtaining them: It could be better. The specialty has indeed financial problems. Also, there is too much focus on physical medicine and spa therapy compared to medical rehabilitation.
13. How the "Mediterranean Forum of PRM" could help for the solution of the main problems affecting the specialty in your country?
Together with the EU there should be some guidelines, some uniformity of PRM.
14. How your "country" (PRM Society) could help for the solution of the main problems, which affect the Rehabilitation Services in other Mediterranean countries through the "Mediterranean Forum of PRM"?
We have lot of experience in spa therapy, not evidence based, but for sure our patients are very happy with it. We should together focus more on natural therapeutic factors associated with rehabilitation and physical medicine; this could bring also financial benefits for PRM and its specialists.

7. ISRAEL (Avi Ohry)

1. Name of the specialty: Physical Medicine and Rehabilitation
in practice: 90 2. Number of PRM specialists: in training: 90
Per 100000 inhabitants: Inhabitants:
3. Total number of physicians:
desirable: 4. Percentage PRM specialists: at present:0.5%
5. Methods to practice: Most of the physiatrists are employed by various governmental, non-profit org. or sick-fund org. There is almost no private rehab. Facility. Part time private occupation are practiced in parallel: EMG, medico-legal reports, consultancies etc.

6. General terms of PRM practice in your country: as in Europe or in the USA
Total number of Rehabilitation beds: at present: 1160 including geriatric rehab.
General Rehabilitation Centers (No. & which): 8-10% of all beds.
Rehabilitation Centers focused on special PRM branches
(No. & which):
Hadassah Jerusalem – a ward within the medical center (MC)

Sheba Med. Center - a wing within the MC
Tel Aviv Municipal hospital – a ward within the MC
Reuth MC – a wing within the MC
Lewenstein Hospital – a rehab. Hospital
Nahariyah and Ashkelon rural hospitals with small rehab. Units
Bnei Zion, Haifa – a ward within the MC
Few community based rehab. units

7. Education and Training:

1. No. of Medical Schools where PRM specialty is offered: 3
2. Educational PRM manpower: Professors: 4 Others: 20-30
3. Duration of PRM Education and training: 5 years residency program
4. Is there a session of PRM education during the pre-graduating period? Yes, only in Tel Aviv University.

8. Man power – Future of the specialty:

A. Pyramid of specialists' ages: More than 60 years old:, 50-60:, 40-50:, less than 40 years old:

B. Man power in the specialty in 2004: , in 2014: .

9. Do you have adequate number of professionals for Rehabilitation Team members?

It is different from center to center. On average, in a ward of 35 beds there are 5-6 PT, 4-5 OT, 1 Psychologist, 1-2 SW, 20-30 nurses and auxiliaries (nurse assistants), 1-2 speech pathologists, all prosthetists are not employed by the hospital but rather by private firms.

10. Continuing Medical Education (C.M.E./C.P.D.) in our specialty.

Only at Tel Aviv University: 3 years program.

8. ALBANIA (Fatmira Reci)

Albania, the poorest European country has been involved in a period of significant political, economic, social, cultural and institutional change. Nowadays, due to the difficult conditions that the Albanian society is passing through the economic and political problems faced, have brought about an underestimation of the social problems, especially those related to the individual. All this is due to the difficult period of transition and confusion of our society and our individuals. Actually the Albanian reality is considered as being a very severe one. It's very important to face the situation in Albania in a realistic way, to change and not to idealize it. The situation in Albania, in the specialty of PRM is as follows:

Albania estimates about 3.100.000 inhabitants, among them 31.000 physicians. The number of PRM specialists in practice is 20 or 0.6 person per 100.000 inhabitants.

Methods to practice:

1. Private practice a- full time 60 % b- part time 40%
2. Salaried practice a- full time 150 b- part time 100

In Albania there aren't general Rehabilitation Centers or Rehabilitation Centers focused on special PRM branches. In our hospital there are 20 rehabilitation beds at present. In Albania there are no medical Schools, where PRM specialty is offered. The age of specialists is: 80% from 40 to 50 years old and 20% less than 40 years old.

We have difficulties in obtaining PRM instruments because of the lack of experience, lack of staff and lack of training.

In Albania there are no real official statistics concerning occupational therapists, speech therapists and clinical psychologists. Physiotherapy is one of the best therapies for physical rehabilitation and for this it is important to build a therapy center equipped with the most useful elements for physical rehabilitation and other means needed to make the therapy more interesting, especially for kids. The creation of a training center is also a way to help disabled persons. The purpose will be the training of the wheelchair users, parents of children with disabilities, who by themselves will be able to train the others, contributing in this way to the improving of disabled persons' conditions.

9. SERBIA & MONTENEGRO (Natasa Vucetic)

1. The medical service in generally in our country is dependent on the Funds supplied by the State Health Insurance. These Funds have been continually reduced due to various factors: depression of the country's economy resources and the consequently growth of the unemployed - who are no more active contributors to the Health Insurance Funds; growth of the elder population (at a rate 2 times faster than in the USA), who are active users of these Funds; rapidly decreasing number of young and productive people (migrations out of the country for several reasons), downfall in natality, etc.

The alternative, Private Health Insurances are available, but the majority of patients cannot afford them.

One of the main problems in our medical institutions and PRM is the condition of our diagnostic and therapeutic devices and other equipment, which is in generally both decaying and out of date or is altogether unavailable.

3. We have practically none of the adequate institutions for rehabilitation of old population, whose number is growing rapidly. This population is mostly poor and incapable of paying for these services, orthopaedic devices, medicaments, etc.

Treatment in private medical institutions is not covered by the Government Health Insurance and thus unavailable to majority of patients.

4. Our PRM professional staff has no access to various international associations in spite of their adequate education, because our educational programmes in Medical Schools are not synchronized with those in most European countries and the USA, but they are in the process of transformation now. The post-graduate specialization in this field is unavailable in our country and very few professionals can afford this education abroad, due to their insufficient income.

5. All these might give some ideas how to help our country, perhaps by establishing specific funds for solving some of the problems mentioned above.

10. ALGERIA (Abdeslem Bensabra)

The problems in Algeria consist of: Material and human means lack. Lack of consideration for the physical medicine specialty because considered like minor discipline by our system of health. Absence of exchanges and cooperation with the medical teams of other countries. Abroad perfection practicum absence.

11. EGYPT (Tarek Shafshak)

In Egypt there are over 30 governorates (districts), the total population is > 70 millions. I am trying to collect the answer for each question as correct as possible. Some of the doctor passed, others moved outside the country. Many are moving in & outside the country, working in the Persian gulf region or USA. Many new specialists & PT are getting certificates as time passes; others are quiting. This needs continuous readjustment.

12. GREECE

1. Name of the specialty:

PHYSICAL MEDICINE AND REHABILITATION

2. Number of PRM specialists: in training: **35** in practice: **146**

Inhabitants: **10.600.000** Per 100000 inhabitants: **1,37**

3. Total number of physicians:
4. Percentage PRM specialists: at present: desirable:
5. Methods to practice: 1. Private practice: a. Full time: (**64**%), b. Part time: (**12**%),
2. Salaried practice: a. Full time: (**35**%),

(**6**%). b. Part time:
6. General terms of PRM practice in your country:
Total number of Rehabilitation beds: at present: **190** desirable: **1000**
General Rehabilitation Centers (No. & which): **6***
1. PRM Dept. in Asklipieion Hospital, Voula, Athens
2. PRM Dept. in KAT Accident Hospital, Kifisia, Athens
3. PRM Dept. in Genimatas Hospital, Athens
4. PRM Dept in Thriassion Hospital, Athens
5. Two PRM Dept. in the National Center for Rehabilitation of Handicapped
Rehabilitation Centers focused on special PRM branches (No. & which): **Not existing**
7. Education and Training:
No. of Medical Schools where PRM specialty is offered: **NO**
Educational PRM manpower: Professors: **-** Others: **-**
Duration of PRM Education and training: **5 years**
Is there a session of PRM education during the pre-graduating period? **NO – selective course in one medical school**
8. Man power – Future of the specialty:
A. Pyramid of specialists' ages: More than 60 years old: **1**, 50-60: **22**, 40-50: **100**, less than 40 years old: **23**
B. Man power in the specialty in 2004: **146**, in 2014: **205**.
9. Do you have adequate number of professionals for Rehabilitation Team members?
a. No. of Physiotherapists: present: **4800** desirable:
b. No. of Occupational Therapists: present: **500** desirable:
desirable: c. No. of Speech Therapists: present: **280**
desirable: d. No. of Clinical Psychologists: present:
desirable: present: e. No. of Social Workers:
desirable: f. No. of Prosthetists / Orthotists: present:
10.Continuing Medical Education (C.M.E./C.P.D.) in our specialty.
a. Society's Program: **Seminars, Congresses, Courses**
b. Educational Resources for PRM: **-**
11. Problems of collaboration between Government or National Health Insurance
Authorities and PRM Society, PRM Foundations etc:
Low and insufficient costs for Rehabilitation acts
12. PRM Instruments or devices in the country: considered enough? **NO**
Difficulties in obtaining them: **Due to high cost**
13. How the "Mediterranean Forum of PRM" could help for the solution of the main problems affecting the specialty in your country? Links between the member countries of the Med Forum
14. How your "country" (PRM Society) could help for the solution of the main problems, which affect the Rehabilitation Services in other Mediterranean countries through the "Mediterranean Forum of PRM"?
EXCHANGING PROGRAMS and HARMONISATION of PROGRAMS

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13. TUNISIA

1. Name of the specialty: Médecine Physique-Rééducation-Réadaptation Fonctionnelle (Physical Medicine-Functionnal Rehabilitation)
in practice: 38 2. Number of PRM specialists: in training: 18
Inhabitants: 10 000 000
3. Total number of physicians: 12 500
desirable: 4. Percentage PRM specialists: at present: 38
14/38 5. Methods to practice: 1. Private practice: a. Full time:
0 b. Part time:
24/38 2. Salaried practice: a. Full time:
0 b. Part time:
6. General terms of PRM practice in your country:
Total number of Rehabilitation beds: at present:106 desirable:
General Rehabilitation Centers (No. & which): 1 public; 3 private and 4 universitary departments of PRM in Tunisia (1/ universitary hospital depending of the 4 Universities of Medicine in Tunisia)
Rehabilitation Centers focused on special PRM branches (No. & which): 2 in Neurological PRM (1 in National Neurological Institute, 1 private)
7. Education and Training:
No. of Medical Schools where PRM specialty is offered: 4
Others: 8 (AHU) Educational PRM manpower: Professors: 4
Duration of PRM Education and training: 4 years
Is there a session of PRM education during the pre-graduating period? Yes
8. Man power – Future of the specialty:
A. Pyramid of specialists' ages: More than 60 years old: 1, 50-60: 1, 40-50: 30, less than 40 years old: 6
B. Man power in the specialty in 2004:, in 2014: .
9. Do you have adequate number of professionals for Rehabilitation Team members?
desirable: a. No. of Physiotherapists: present:3000
present:14 desirable: b. No. of Occupational Therapists:
c. No. of Speech Therapists: present:19 private; public? desirable:
desirable: d. No. of Clinical Psychologists: present: 22
desirable: present: 60 e. No. of Social Workers:
desirable: f. No. of Prosthetists / Orthotists: present:60
10.Continuing Medical Education (C.M.E./C.P.D.) in our specialty.
a. Society's Program: annual congress of Tunisian Society of PRM (SOTUMER); annual workshops organized by SOTUMER
b. Educational Resources for PRM: international congress, workshops.
11. Problems of collaboration between Government or National Health Insurance
Authorities and PRM Society, PRM Foundations etc.
12. PRM Instruments or devices in the country: considered enough? NO
Difficulties in obtaining them: High Cost for modern equipment in PRM instruments.

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14. CYPRUS (Southern and Northern)

1. Name of the specialty: "Physical Medicine and Rehabilitation".
2. Number of PRM specialists: in training:---in practice:**5(s)+4(n) = 9**
Inhabitants: Per 100000 inhabitants: **0.9**
800000 (s)+200000 (n) = 1000000
Total number of physicians: .3
2000 (s) + 410 (n) = 2410
desirable: Percentage PRM specialists: at present: **0.37%** .4
Methods to practice: .5
(**44.4%**), 1. Private practice: a. Full time: **3(s)+1(n)=4**
(**44.4%**), b. Part time: **1(s)+3(n)=4**
2. Salaried practice: a. Full time: **1(s)** (**11.2%**),
b. Part time: **1(s)+3(n)=4** (**44.4%**).
6. General terms of PRM practice in your country:
Total number of Rehabilitation beds: at present: **35(s)** desirable: **135**
General Rehabilitation Centers (No. & which):
1 (Limassol Center of PRM)
Rehabilitation Centers focused on special PRM branches (No. & which):
Wing for Spinal cord injuries Rehabilitation at Nicosia Hospital: **13 beds**.
Veterans Hospital wing at Palodhia for stroke Rehabilitation: **7 beds**.
7. Education and Training:
No. of Medical Schools where PRM specialty is offered: **No Medical Schools in Cyprus,** but for Turk-Cypriots half of the duration of specialist training is offered at public hospital and the other half must be completed at one of the hospitals of Turkey offering PMR specialist training.
Educational PRM manpower: Professors:---Others: 3 specialists (n)
Duration of PRM Education and training: 2.5 years (out of 5) for Turk-Cypriots.
Is there a session of PRM education during the pre-graduating period? Not in Cyprus.

8. Man power – Future of the specialty:
A. Pyramid of specialists' ages: More than 60 years old: **1(n)**, 50-60: **2(s)**, 40-50: **3(s)+2(n)=5**, less than 40 years old: **1(n)**
B. Man power in the specialty in 2004: **5(s)+4(n)=9**, in 2014: **20**.
9. Do you have adequate number of professionals for Rehabilitation Team members?
a. No. of Physiotherapists: present: **250(s)+30(n)** desirable: **300** present: **30(s)** desirable: **100** b. No. of Occupational Therapists: desirable: **80** c. No. of Speech Therapists: present: **52(s)** d. No. of Clinical Psychologists: present: **14(s)+12(n)** desirable: **30** present: **10(s)+ 6(n)** desirable: **20** e. No. of Social Workers: f. No. of Prosthetists / Orthotists: present: **2(s)+ 3(n)** desirable: **8**
10.Continuing Medical Education (C.M.E./C.P.D.) in our specialty. **YES(s) – NO(n)**
a. Society's Program:**Yes(s)**:linked with the Cyprus Medical Association program
No PRM Society in Northern Cyprus.
b. Educational Resources for PRM: **None financially,** but use of medical journals, internet, congresses and educational courses abroad.
11. Problems of collaboration between Government or National Health Insurance Authorities and PRM Society, PRM Foundations etc.
We try to convince government to operate Rehab. Units in the district hospitals under the responsibility of specialists in PRM. Also, we have problems with the physiotherapists' association who want to transform the relevant law for giving them independency to assess and treat patients without a medical referral containing the medical diagnosis and the necessity for physiotherapy. Also, they want to forbid specialists in PRM to use any physiotherapy treatments and some of them they are presented as "professionals for physiotherapy and (physical) rehabilitation".
Also, in Northern Cyprus there are difficulties in accepting the explanation of the role and importance of the speciality and the Rehabilitation team management, which leads to conflicts between PRM specialists and the physiotherapists.
12. PRM Instruments or devices in the country: considered enough? **NO**
Difficulties in obtaining them? Mainly financial problems.
13. How the "Mediterranean Forum of PRM" could help for the solution of the main problems affecting the specialty in your country? The Board of the MFPRM could conduct the Authorities, giving details for the importance of the key role of the PRM specialist in the Rehabilitation process, the importance of the implementation of Rehabilitation Services in each hospital, as well as of the creation of a Main Rehabilitation Centre in Cyprus. Having support to our problems from a large group, representing lots of countries we can make our voice to be louder and provide more interest towards our speciality.
14. How your "country" (PRM Society) could help for the solution of the main problems, which affect the Rehabilitation Services in other Mediterranean countries through the "Mediterranean Forum of PRM"?
By enforcing the MFPRM to make a plan of action between the richer and the poorer Mediterranean countries to solve their problems of PRM unemployment, of obtaining PRM instruments and devices and organizing accredited PRM Centers. Also, by encouraging local PRM congresses between 2 or more countries of the area under the auspices of MFPRM. Also, being a small group and working for a small population, we may serve as good models for trying new settings to make our speciality work more efficientrly.
15. Any other recommendations?
- Specialists exchange programs for CME. This may even be around special protocols due to certification problems in different countries.
- Closer conduct between the PRM specialists from different countries through a mail group organization.
- MFPRM must try to organize a Summer School somewhere in the Mediterranean area, for the new specialists in PRM in selected PRM topics.

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15. LEBANON
1. Name of the specialty: Physical Medicine
2. Number of PRM specialists: in training:- in practice: 15 MD Inhabitants: 4 millions Per 100000 inhabitants: 0.125
3. Total number of physicians: 4.000
4. Percentage PRM specialists: at present: 15 (10%), desirable: 30
5. Methods to practice: 1. Private practice: a. Full time: (20%), b. Part time: (20%), 2. Salaried practice: a. Full time: (50%). b. Part time:
6. General terms of PRM practice in your country:
d. Total number of Rehabilitation beds: at present: 100 desirable: 200
e. General Rehabilitation Centers (No. & which): 16
f. Rehabilitation Centers focused on special PRM branches (No. & which): 4
7. Education and Training:
5. No. of Medical Schools where PRM specialty is offered: None
6. Others: - Educational PRM manpower: Professors: 2
7. Duration of PRM Education and training: Not available
8. Is there a session of PRM education during the pre-graduating period? yes
8. Man power – Future of the specialty:
A. Pyramid of specialists' ages: More than 60 years old: 3, 50-60: 6, 40-50: 4, less than 40 years old: 2
B. Man power in the specialty in 2004: 15, in 2014: ?
9. Do you have adequate number of professionals for Rehabilitation Team members?
a. No. of Physiotherapists: present: 600 desirable: saturated present: 5 desirable: 100 b. No. of Occupational Therapists: desirable: 100 c. No. of Speech Therapists: present: 50 desirable: 50 d. No. of Clinical Psychologists: present: 10 desirable: 100 present: 100 e. No. of Social Workers: f. No. of Prosthetists/Orthotists: present: 60 desirable: saturated
10.Continuing Medical Education (C.M.E./C.P.D.) in our specialty.-
a. Society's Program: occasional
b. Educational Resources for PRM: -
11. Problems of collaboration between Government or National Health Insurance Authorities and PRM Society, PRM Foundations etc. Existing
12. PRM Instruments or devices in the country: considered enough? NO

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16. MALTA
1. Name of the specialty: Physical Medicine
in practice: 1 2. Number of PRM specialists: in training: 0 Per 100000 inhabitants: 0.25% Inhabitants: 400,000
3. Total number of physicians:around 100 specialists out of total 600-700 doctors
4. Percentage PRM specialists: at present: 0.03% desirable: at least 1-2%
(%), 5. Methods to practice: 1. Private practice: a. Full time: (%), b. Part time: (100%), 2. Salaried practice: a. Full time: (%). b. Part time:
6. General terms of PRM practice in your country:
g. Total number of Rehabilitation beds: at present: 100 but only over 65 years i.e. geriatric rehab desirable: at least 200 beds but also for younger ages
h. General Rehabilitation Centers (No. & which): nil
i. Rehabilitation Centers focused on special PRM branches (No. & which): nil
7. Education and Training:

No. of Medical Schools where PRM specialty is offered: nil .10

Educational PRM manpower: Professors: nil Others: nil .11

Duration of PRM Education and training: N/A .12

Is there a session of PRM education during the pre-graduating period? No .13

8. Man power – Future of the specialty:

A. Pyramid of specialists' ages: More than 60 years old:, 50-60:, 40-50: 1 , less than 40 years old:

B. Man power in the specialty in 2004: 1, in 2014: ??

9. Do you have adequate number of professionals for Rehabilitation Team members?

a. No. of Physiotherapists: present: 40 desirable: 70

b. No. of Occupational Therapists: present: 25 desirable: 40

c. No. of Speech Therapists: present: 3 desirable: 10

d. No. of Clinical Psychologists: present: 5 desirable: 15

e. No. of Social Workers: present: ?? desirable:

f. No. of Prosthetists / Orthotists: present: 1 desirable: 3

10.Continuing Medical Education (C.M.E./C.P.D.) in our specialty.

a. Society's Program: N/A

b. Educational Resources for PRM: N/A

11. Problems of collaboration between Government or National Health Insurance Authorities and PRM Society, PRM Foundations etc. N/A

12.PRM Instruments or devices in the country: considered enough? NO

Difficulties in obtaining them: financial and speciality not considered on high ranking.

13. How the "Mediterranean Forum of PRM" could help for the solution of the main problems affecting the specialty in your country?

We need more awareness for the speciality and more specific specialization since most consultants in Malta follow English school where Rehab is incorporated as part of their management. It is not even listed in most countries on the Specialist Register!! Forum needs to improve awareness in this respect. Main problem at present is AWARENESS!!

14.How your "country" (PRM Society) could help for the solution of the main problems, which affect the Rehabilitation Services in other Mediterranean countries through the "Mediterranean Forum of PRM"? Owing to present resources, definitely no help !!

15.Any other recommendations?

Maybe, official invitation or information to Health Dept in respective countries to improve collaboration.

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OP001

CEREBRAL BLOOD FLOW VELOCITY DURING POSTURAL CHANGES ON TILT TABLE IN STROKE PATIENTS

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Background: Orthostatic Hypotension (OH) is associated with ischemic stroke and can affect a rehabilitation outcome. Appearance of OH symptoms may be related to blood flow velocity changes in main brain arteries as measured by Transcranial Doppler ultrasound (TCD) monitoring.

Objectives: To investigate the correlation between OH and mean flow velocity (MFV) in middle cerebral artery (MCA) bilaterally during Tilt Table Test (TTT) in acute ischemic stroke patients, undergoing rehabilitation.

Methods: 13 patients aged 58 (± 11.7) years after first ischemic stroke in the MCA territory (study group) and 13 healthy volunteers aged 51 (± 10.4) years (control group) were examined. TTT was performed with elevating the subject from supine to 80º standing position and back to supine within 10 minutes. Peripheral blood pressure was measured and monitoring of MFV in MCA of damaged and healthy hemisphere by TCD was performed during the TTT. Patients in study group underwent the test few days after admission to rehabilitation department. Patients were classified into 2 subgroups: those with decrease of systolic blood pressure of at least 20 mm Hg during the test (N-5, group 1) ant those without the symptoms of OH (N-8, group 2).

Results: No symptoms of OH was found in control group and no significant changes in MFV bilaterally during TTT were detected. Among group 2 patients without symptoms of OH MFV indices

were almost the same in damaged and healthy MCA and did not change during the test. Patients with OH symptoms (group 1) showed significant differences between blood flow velocities in two hemispheres. MFV in the damaged MCA was 30.3± 10.5 cm/sec at supine position and stayed almost the same (26.6± 9.4 cm/sec) at 80º standing. In the undamaged MCA, on the contrary, MFV was much higher- 59.4± 18.2 cm/sec at supine and dropped to 49.0± 17.4 cm/sec at 80º standing position.

Conclusions: These findings suggest, that decreased blood flow velocity in damaged MCA at the beginning of rehabilitation treatment after ischemic stroke may be associated with symptoms of OH. Among post-stroke patients the decrease in peripheral blood pressure during TTT is correlated with MFV drop in healthy MCA, but not in damaged hemisphere artery.

OP002

EFFICACY OF FUNCTIONAL ELECTRICAL STIMULATION IN IMPROVING WALKING ABILITY FOR SEDENTARY PEOPLE WITH MENTAL RETARDATION

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Objectives: To investigate the effects of electrical stimulation on MR sedentary patients with walking difficulties.

Background: Rehabilitation programme routinely used for improving limb function and walking has included the stretching, strengthening, splinting and mobilisation. A number of investigators reported electrical stimulation can improve the limb function, Qin et al(1996) and Jezernik (2003).

Although new techniques of treatments are becoming available for patients with movement difficulties, most still need to be evaluated for their efficacy, parameters and the method of application.

The study reported here has been designed to test the hypothesis that using electrical stimulation with conventional rehabilitation would significantly improve the limb function more than conventional rehabilitation techniques alone and enhance range of motion of the limbs and the muscle bulk.

Subjects: An initial sample of 10 sedentary patients who are hospitalized in a Disabled Center in Semnan, Iran, with gait difficuties have participated in a five week functional improvement programme.

The criteria for selection of patients for the rehabilitation programme were as follow.

1) having a normal sensation, such as thermal, tactile and pain sensitivity.

2) Presence of drop foot or limitation in ankle movements.

Candidates with cardiovascular infraction or any abnormality in sensation were excluded.

The subjects are allocated randomly in one of two groups; 1) conventional with electrical stimulation. 2) conventional treatment.

Procedure: Each subject received a clinical evaluation of limb function and muscle strength including goniometer assessment.

The study is being carried out at The Disabled Center of 12th Azar, Semnan, Iran.

Prior to the start of investigation the assessments were carried out. The assessments were:

A goniometer was used for measurement of the joint range of motion.

A tape measure was used for measurement of the muscle bulk.

Walking Speed test is carried out for each subject pre and post treatment.

All the measurements are carried out as pre test and post test.

Apparatus: An available two channel Neuromuscular Stimulator is used for the treatment.The intensity of stimulation was set based on the pilot study on normal subject tolerance.The frequency of stimulus pulses of 35 Hz has been shown to be suitable.

Treatment programme: The treatment programme will be focused for improving limb function within the period of 30 minutes, three days a week for five weeks. The target limb was the leg. Stimulation was applied on the tibialis anterior muscle.

Before starting the experiments the optimal frequency and intensity for subject comfort was determined on normal subjects.The patients received one of the two rehabilitation programme as mentioned.

Data Analysis: The data will be collected during the experiments and the standard statistic tests will be employed for analysis of data. Preliminary results will be submit during the Congress.

OP003

STROKE IN YOUNG ADULTS

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Objectives: To evaluate demographics, etiologies, neurologic presentations, risk factors, associated disorders and functional outcome of young stroke adults.

Methods: In this study, young stroke patients (15 to 45 years old) were retrospectively evaluated for their clinical and demographical data.

Results: One hundred and sixteen young adult with stroke were included in this study. Fifty-seven were male and fifty-nine were female, their mean age was 33.8±8.4 years. The major etiological factor was thromboembolism with 25.9% and followed by intracerebral hemorrhage with 16.4% and cardioembolism with 13.8%. The average length of stay in hospital was 47.33±19.09 days. The most common risk factors were smoking (28.4%), hypertension (22.4%), family history of stroke (16.4%) and history of cerebrovascular accident (15.5%). The most commonly encountered complication during to hospital stay was shoulder pain with 46.6%, followed by subluxation with 28.4%, osteoporosis with 26.7%. At discharge 52.6% of patients were ambulated with short leg braces with canes, 24.1% of patients were ambulated with only canes, 7.8% of patients were ambulated indepedently, 7.8% of patients were mobile with a wheelchair and 4.3% of patients were ambulated at parallel bar

Conclusions: Stroke in young adult has a relevant impact on yeras of potential life lost and on socioeconomic cost considering the long life expectancy at these age. So, preventative measures are strongly recommended in the presense of any risk factors.

OP004

THE RELATIONSHIP BETWEEN MODIFIED ASHWORTH SCALE AND ISOKINETIC ASSESSMENT OF SPASTICITY IN PATIENTS WITH SPINAL CORD INJURY

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Objectives: The aim of this study was to assess the correlation of modified Ashworth scale measurement with isokinetic measurement in spasticity of spinal cord injured patients.

Methods: Thirty spinal cord injured patients with a spasticity grade of 1-4 (modified Ashworth) were included in the study. The patients with voluntary lower extremity movements were excluded. A physician and a therapist evaluated the modified Ashworth grade of

knee and ankle joints on both sides of the patients. The spasticity was tested at eccentric mode by isokinetic dynamometer and peak torque values obtained by testing both knee and ankle joints at 30, 60 and 120º/sec angular velocities were recorded. The examiners were blinded with the results of the other examiner and the isokinetic dynamometer. All patients were examined at sitting position by the examiners and the isokinetic dynamometer to minimise the effect of position on spasticity. The correlation within modified Ashworth and isokinetic measurements and the correlation between them were examined.

Results: The correlation within modified Ashworth scores were moderate-high (rho: 0.59-0.75, p: 0.00). On the other hand, the correlation within the peak torque values at 30, 60 and 120º/sec angular velocities were also moderate-high (rho: 0.40-0.90, p: 0.00-0.02). However, there was not any correlation between modified Ashworth scores and peak torque values.

Conclusions: In this study, it was found that there was no significant relationship between clinical and isokinetic measurements of spasticity.

OP005

INTERNAL SPLINTING FOR RADIAL AND ULNAR NERVE INJURIES

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Objectives: Internal splinting is an early tendon tranfer performed during or just after nerve repair and is a controversial issue. The objectives of internal splinting are avoiding the use of long term external splinting, avoiding permanent hand deformities during nerve recovery, supporting sensorial recovery and temporary substitution for the palsied motors until the nerve is reinnervated. In this clinical study we present our clinical cases of internal splinting and discuss the results in terms of indications, timing, advantages, and disadvantages of internal splinting.

Methods: We applied internal splinting in 3 patients with radial nerve injury and in 8 patients with ulnar nerve injury. Internal splinting was performed contemporarily with the nerve repair in 5 patients, in 2 weeks following nerve repair in 1 patient and in 4 weeks following nerve repair in 5 patients. Pronator teres and flexor carpi radialis were transfered in radial nerve injuries whereas our modification of Omer's superficial Y technique was used for ulnar nerve injuries. All patients received physiotherapy postoperatively and were followed up for 1 year with physical examination and ENMG.

Results: None of the patients had early or late postoperative complication. Recovery of sensorial and motor functions were achieved in all patients without permanent hand deformity.

Conclusions: We concluded that internal splinting avoided external splint useage, worked as a substitute during recovery of the nerve and prevented the establishment of hand deformity during recovery of the nerve. The contribution of internal splinting to sensorial recovery was noteworthy but the number of our cases was limited to come to a definite conclusion. We did not experience any major disadvantage of internal splinting.

OP006

REHABILITATION OUTCOMES IN FLEXOR TENDON INJURIES

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**Ankara Numune Training and Research Hospital Plastic and Reconstructive Surgery, Turkey

Objectives: To evaluate the results of early rehabilitation programs and to analyze the quality of functional outcomes after flexor tendon repairs in the hand.

Patients and Method: One hundred and fifty-five consecutive patients with flexor tendon repair were treated. All patients were followed up with modified Kleinert technique. The functional results of the fingers were evaluated by Buck- Gramcko system and total active motion measurements.

Results: The mean age of the patients was 28.6 ± 11.52 years. The 92.2 % of the patients were males and 44.2% had Zone II flexor tendon injury. Grip strength results were excellent in 14.4 % good in 76.3 %, fair in 9.3 %; the total active motion results were excellent in 59.9 % and good in 29.9 % of the fingers.

Conclusion: The modified Kleinert technique provides satisfactory hand function in patients with flexor tendon injuries but further investigations must be planned for minimize the factors effecting final outcome like, patient cooperati

OP007

COMPUTER AIDED TOOL FOR ACTIVE ARM'S WORKSPACE IN SHOULDER PAIN PATIENTS

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Objectives: To create a computer programme for graphical and numerical presentation of the arm's workspace based on the arm's kinematic model including the glenohumeral joint with free shoulder girdle and elbow movements. Clinical application in shoulder pain patients.

Methods: Based on the classically measured height and shoulder range of motion (ROM) the arm's workspace ws calculated and presented in qualitative (three-dimensional graphics) and quantitative form (calculated volume in dm3). Passive and active shoulder ROM of the painful and the healthy arm were measured. It was performed at the beginning, during the treatment as control, and at the end of the treatment. Flexion, extension, internal and external rotation, abduction and adduction in flexion were measured in degrees of declination in sagittal, frontal and horizontal planes. The declination values and height are the input data for the computer application.

Results: The computer tool presents a three-dimensional graphical arm's workspace and its volume value from the input data: passive and active shoulder ROM of involved arm at the beginning, at follow-up and at the end of the treatment. Trunk volume is considered an obstacle to arm movement. Changes in involved arm and healthy arm's workspace of the same subject are documented.

Conclusions: Standard shoulder ROM measurement in the agreed planes, is not understandable to usual users: patients, family doctors, health and social insurance company doctors. Arm function is related to compensatory movements of the scapula and the elbow. The arm`s workspace tool presents the area within reach of the wrist. Compared with standard methods, is closer to the physiological events and more user-friendly. It offers computer aided documentation and a new approach to the evaluation of arm disability.

OP008

PHYSICAL THERAPY OF HEMOPHILIAC ARTHROPATHY IN CHILDREN

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Objective: The vast majority of bleeding incidences in hemophiliacs occur within the musculoskeletal system. Hemorrhages may occur spontaneously or as a result of a trauma. They may have secondary harmful effects upon the developing skeleton.

Methods: From January 2001 until December 2003 at the Mother and Child Health Institute we performed 97 physiatrist examinations on 30 children with hemophilia aged from 8.5 months to 19 years. Most frequent bleedings were in knees, elbows and ankles. Seven of our children had chronic synovitis. Physical therapy, after the administration of substitution therapy, consisted of: applying of cold packs, electrotherapy, exercise programs and prescription of orthopedic shoes and inlays when necessary.

Results: The therapy was considered successful in children with acute bleeding if the joint was restored to normal considering its circumference, range of movement and muscle strength. In chronic synovitis it meant that the joint was not swelled, there were no recurrent bleedings in it and the muscle strength was 4 to 5. The treatment was successful in all children with acute bleeding. In children with chronic synovitis range of movement and muscular strength were decreased.

Conclusions: Physical therapy is important in treating hemophiliacs as it prevents invalidity.

OP009

POSTUROGRAPHIC CHANGES AFTER TOTAL KNEE ARTHROPLASTY

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Objectives: to determine posturographic changes in patients one week before and 6 months after treatment with an elective total knee arthroplasty and their relation with clinical variables.

Patients and methods: longitudinal prospective study of 27 patients, with walk ability. Assesment: pain visual analogic scale (VAS), knee range of motion (ROM), quadriceps and strings muscular balance (MB), Barthel index (BI) and SF-36 scale. A battery of 3 dynamic tests was performed using a computerized posturographic platform: sit to stand (STS), walk (W) and step up and over an obstacle (SUO).

Statistic analysis: Student t test for paired samples, Chi squared test and rho Spearman for non parametric correlation. The signficance level was accepted for $p<=0.05$.

Results: at 6 months there were significative changes in: pain VAS decreased a mean of 30.44 mm; extension contralateral knee ROM improved a mean of 4.26; quadriceps MB of the knee protheses increased a mean of 1.04 points, while quadriceps MB of the contralateral knee increased a mean of 0.37; strings MB of the knee protheses increased a mean of 0.56 points, while the contralateral increased a mean of 0.22 points. About the SF-36 the standardized physical component increased a mean of 4.93 points. In the posturographic tests significative changes were: in the STS-test the left/right symetry increased a mean of 4.52%; in the W-test the step length was longer a mean of 2.9 cm, the speed increased a mean of 6.79 cm/sec, the average anterior-posterior centre of gravity sway velocity after forward progression stops decreased 0.599º/sec. Only 18 patients completed the SUO test. Among them, there were significative changes for the MB of the contralateral leg, which increased a mean of 4.83%, and in the movement time of the contralateral leg, which decreased a mean of 0.629 sec. These posturographic variables correlated significantly with pain VAS, ROM, MB, BI and SF-36.

OP010

EFFECTS OF LAMOTRIGINE ON THE SYMPTOMS AND LIFE QUALITIES OF THE PATIENTS WITH POST POLIO SYNDROME: A RANDOMIZED, CONTROLLED STUDY

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Objectives: To find out if lamotrigine gives symptomatic relief and enhances quality of life in the patients with post-polio syndrome

Methods: Thirty patients were randomly assigned to receive or not to receive lamotrigine treatment. Lamotrigine at a daily dose of 50-100mg were given to the fifteen patients, and fifteen patients were used as the control group. Interventional advises and home exercises were given to all of the patients. Clinical assessments were made at baseline and repeated at the second and fourth weeks by the physician who was unaware of medication. The severity of pain, fatigue and muscle cramps were rated on a visual analogue scale. Health-related quality of life was measured using the Nottingham Health Profile. The patient's perceived level of fatigue was assessed using Fatigue Severity Scale.

Results: Comparing to the baseline values, statistically significant improvements were obtained in the mean scores of VAS, NHP and FSS at two weeks and four weeks in the patients on lamotrigine. No significant improvements were reported in the control group.

Conclusions: These preliminary results indicate that lamotrigine relieves the symptoms and improves the life qualities of the patients with post polio syndrome.

OP011

THE EFFECT LUMBAR ORTHOSIS ON TRUNK MUSCLE STRENGTH IN HEALTHY SUBJECTS

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Objectives: Lumbar orthosises are frequently used in the management of low back pain and are also common intervention in industry to prevent back injuries. Studies showed that lumbar orthosises relief low back pain. Although there are opinions that lumbar orthosis causes muscle atrophy, these are not based on scientific proofs but clinical observations and beliefes. The study was designed as, prospective, randomised, controlled and blinded to research the effects of lomber orthosis on trunk movements and lumbar and abdominal muscle strength.

Methods: 50 healthy volunteers, with no previous low back pain and had normal physical examination were included this study. The volunteers were randomised into two groups. There were no differences in age, length and body mass index (BMI) between groups. First group (Group 1) wore lumbar orthosis for 28 days and 8 hours in a day. The second group (Group 2) was control group. Modified schober and hand-finger-floor distances were measured at the begining and 4 weeks later. Trunk muscle strength were measured by Cybex Norm dynamometry.

Results: At the end of study, in Group 1, isokinetik flexion and extansion measurements at 60°/sc and 120°/sc angular velocities were increased. Increases in 60°/sc and 120°/sc angular velocities extansion values were stastistically significant. Isometric extansion values were increased but not stastistically significant. There were no changes in isometric flexion measurements. In Group 2, isokinetik flexion measurements at 60°/sc and 120°/sc angular velocities, extansion measurements at 120°/sc angular velocities and isometric flexion values increased but were not statistically significant. Ysometric extansion measurements decreased but were not statistically significant. There were no changes in extansion values at 60°/sc angular velocities.

Conclusions: In conclusion wearing lumbar in orthosis healthy subjets did not change trunk movements. Isokinetic flexion strength did not change but there were stastistically imporevement in trunk extansion strength after 28 day follow-up.

OP012

EFFECTS OF SIMVASTATIN ON BONE MINERAL DENSITY AND REMODELING PARAMETERS IN POSTMENOPAUSAL OSTEOPENIC SUBJECTS: 1 YEAR FOLLOW-UP STUDY.

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Objectives: To investigate the effects of simvastatin on bone metabolism and BMD in postmenopausal subjects with hypercholesterolemia.

Methods: For this purpose, 32 postmenopausal osteopenic subjects who were given simvastatin treatment (20 mg/day) and not on osteoporosis treatment were included in the study. Bone mineral density was measured at pretreatment and at the end of the 1 year follow-up period. Bone remodeling parameters were assessed during baseline and 3rd, 6th and 12th month of the following period.

Results: During the follow-up period, total cholesterol level was decreased from 262.1±30.9 to 202.2±30.1 mg/dl ($p<0.0001$). At a period as early as 3rd month, levels of the anabolic markers, e.g., bone specific alkaline phosphatase (BSAP) and osteocalcin (OCL) were found to be significantly increased (120.8±56.6 IU/L to 149.5±57.6 IU/L, $p=0.008$, and from 20.8±12.6 microg/L to 34.7±18.4 microg/L, $p=0.015$, respectively) while no significant change was observed in the resorptive marker of serum N-telopeptide of type I collagen (CTX). At the 6th and 12th months BAP and OCL were both found to be decreased below the pretreatment values. The reduction in BAP was significant (from 120.8±56.6 IU/L to 55.9±18.8 IU/L, $p<0.001$). A non significant reduction trend was observed in CTX levels after 6 months. Parathyroid hormone (PTH) showed a gradual profound increase during the follow-up period (from 62.7±41.5 to 108.4±51.7 pg/ml, $p<0.001$). No significant changes were observed in BMD levels at spine, femoral neck, Ward's triangle and trochanter.

Conclusions: Simvastatin treatment showed a short-lasting anabolic effect on bone metabolism. However, this effect was lost by prolongation of therapy. The decrease in both anabolic and resorptive markers at 6th and 12th months, suggests that simvastatin affects bone metabolism mostly in favor of inhibition of the bone turnover in long term period although this inhibitory effect was not reflected to BMD.

OP013

EFFECTS OF NUMBER OF PREGNANCIES AND LONG LACTATION DURATION IN POSTMENOPAUSAL OSTEOPOROSIS

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Objectives: The aim of this study was to investigate the effects of number of pregnancies and lactation duration on bone mineral density in postmenopausal osteoporosis.

Methods: Data of 401 postmenopausal women who were admitted to our outpatient clinic between 1997 and 2004, and diagnosed as osteopenia or osteoporosis according to DEXA were analyzed retrospectively. Study parameters included age at menopause, age at first pregnancy, number of pregnancies and births, and total lactation duration.

Results: Mean age of the study population (n=401) was 60.7 ± 8,1 years. Mean age at menopause and at first pregnancy were 44.9 ± 6.9 and 20.7 ± 4.4 years, respectively. Mean number of pregnancies and births were 4.6 ± 3.1 and 3.4 ± 2.1, respectively. Mean lactation duration was 37.6 ± 41.3 months. No correlation was found between the BMD values and menopausal age, age at first pregnancy. Lumbar 2 (L2) and L3 t scores were negatively correlated with both number of pregnancies and number of births ($p<0.05$). Weak negative correlation was also found between lactation duration and L1, L2, L3, intertrochanteric region t scores of ($p<0.01$) and total lumbar and hip t scores ($p<0.05$).

Conclusions: Studies of pregnancy and lactation have not provided enough evidence in order to conclude that these events are obvious risk factors for bone loss as long as adequate hormonal environment is restored, including reestablishment of menses and reproductive capacity. But there is currently no evidence that multiple births interspersed with intensive lactation are risk factors for maintaining peak bone mass. Our results concerning this study population with relatively high number of births and long lactation duration may support the idea that women with such reproductive history demonstrate lower bone mineral densities at postmenopausal ages.

OP014

HOW QUALITY OF LIFE IS AFFECTED WITH NEUROPATHIC BLADDER MANAGEMENT IN SPINAL CORD INJURED PATIENTS

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Objectives : To determine spinal cord injured (SCI) patients' compliance with the method of bladder management they used on discharge from inpatient rehabilitation and to compare patients' quality of life who were compliant and not compliant.

Methods: Forthy SCI patients (11 women, 29 men)over 18 years old that were rehabilitated at 70. Yıl İstanbul Physical Medicine and Rehabilitation Training Hospital between the years 1996-2002 were included in this study. Patients were called by telephone minimum 6 months after discharge for reevaluation. Urinary system was evaluated by serum urea and creatinin values, urinary tract

ultrasonography. SF-36 healh survey and Qualiveen (spesific for SCI patients with urinary disorders) were used to assess quality of life.

Results: Group 1 consisted of 17 patients who were compliant, group 2 consisted of 23 patients who were not compliant with the method of bladder management. Compliance with the treatment was %42.5. Age, gender, mean duration of injury, mean duration of management, level of injury and videourodynamic diagnosis were similar in both groups. Urinary tract complications were low in both groups and there were no statistically significant difference between the two groups. In all subscales of Qualiveen except restrictions the scores were higher in group 2 although this differences were not statistically significant. Urinary disorders effect quality of life moderately. According to SF-36 patients that have better physical functioning and mental health were better compliants of treatment method.

Conclusions: Urinary disorders effect quality of life moderately regardless of compliance The good correlation of SF-36 and Qualiveen showed us that Qualiveen is available to use in SCI patients with urinary disorders. As a result close follow ups may prevent SCI patients from urinary tract complications..

OP015

FIBROBLAST TRANSPLANTATION RESULTS TO THE DEGENERATED RABBIT LUMBAR INTERVERTEBRAL DISCS

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Study Design: An analysis of the histological and radiological changes in degenerated lumbar intervertebral discs, after transplantation of fibroblasts in rabbits.

Objectives: To show the viability of the fibroblasts injected to the degenerated discs, and observe their potential for further studies.

Summary of Background Data: The apoptosis of the cell is one of the factors at the disc degeneration process. Fibroblasts may act as mesenchymal stem cells at the tissue to which they are injected and they may replace the apoptotic cells.

Methods: The nucleus pulposus of the discs from eight rabbits were aspirated under scopic guidance to induce disc degeneration. One month later, cultured fibroblasts, which had been taken from the skin, were injected into the disc. The viability and the potential of the injected cells for reproduction were studied histological and radiological.

Results: Cellular formations and organizations indicating to the histological recovery were observed at the discs to which fibroblasts were transplanted. The histological findings of the discs to which no fibroblasts were transplanted, did not show any histological recovery. Radiological, no finding of improvement was found in both groups.

Conclusions: The fibroblasts injected to the degenerated discs are viable. The findings of improvement, observed in this study, suggests that fibroblast transplantation could be an effective method of therapy for the prevention or for the retardation of the degenerative disease of the discs.

OP016

MEASURES OF POSTURAL INSTABILITY IN PATIENTS WITH PARKINSON'S DISEASE

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Objectives: To investigate postural instability and to detect the effectiveness of exercise program on postural instability in patients with idiopathic Parkinson's disease (PD).

Methods: Twenty-one patients diagnosed with idiopathic PD (10 women and 11 men; mean age, 70.9±7.5 years; mean disease duration, 4.42±3.8 years) and 15 age matched healthy controls (8 women, 7 men; mean age, 69.7±6.3 years) were included in this study. The history of falls and the use of assistive device were noted. Postural instability was measured using Berg Balance Test (BBT), Dynamic Gate Index (DGI) and Unified PD Rating Scale (UPDRS) motor subscale. Fear of falling (FOF) was detected using Falls Efficacy Scale (FES). Walking distance was measured on the treadmill. 12 of 21 PD patients agreed to participate an 8 week exercise program including stretching, range-of-motion exercise and treadmill training.

Results: There were statistically significant differences between PD patients and control group for BBT, DGI ($p<0.001$) and FES ($p<0.01$) scores. There were positive correlations between walking distance, BBT and DGI scores ($p<0.001$, $r=0.687$, $p<0.001$, $r=0.640$, respectively). UPDRS motor subscale scores were correlated negatively with BBT and DGI scores ($p<0.001$, $r=-0.678$, $p<0.05$, $r=-0.520$, respectively). There was a significant correlation between the BBT and DGI scores of PD patients ($p<0.001$, $r=0.903$). BBT scores of PD patients were correlated negatively with history of fall and use of assistive device ($p<0.001$, $r=-0.750$, $p<0.05$, $r=-0.509$, respectively). FES scores were correlated negatively with BBT and DGI ($p<0.01$, $r=-0.704$, $p<0.05$, $r=-0.636$, respectively), and correlated positively with age, assistive device use and UPDRS motor subscale ($p<0.05$, $r=0.632$, $p<0.05$, $r=0.574$, $p<0.05$, $r=0.579$, respectively). BBT and DGI scores significantly improved after rehabilitation program ($p<0,05$).

Conclusions: In patients with PD, postural instability can be determined using qualitative and quantitative measures. Postural instability causes gait disturbances and FOF. Spesific exercise programs may produce improvement in mobility and reduces FOF.

OP017

REHABILITATION RESULTS OF PATIENTS WITH ACUTE TRANSVERSE MYELITIS

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Objectives: Acute transverse myelitis (ATM) is characterized by sudden onset of rapidly progressive weakness of the lower extremities, accompanied by loss of sensation and sphincter control. In this study, we aimed to evaluate the efficacy of rehabilitation in patients with ATM.

Methods: A total of 13 patients (6 males, 7 females) with transverse myelitis were included in the study. The mean ± SD of age of the patients was 14.30 ± 3.14. The patients were included in rehabilitation program in the rehabilitation unit, and spasticity values were evaluated by modified Ashworth ort scale at baseline and at the end of treatment. The functional indepence measurement (FIM) and functional ambulatory scale (FAS) values were as well evaluated at baseline and at the end of the treatment, and the results were compared to evaluate the efficacy of treatment.

Results: The mean ± SD of duration of disease was 4.5 ± 1.85 weeks. There was statistically significant difference in modified Ashworth scale, FIM, and FAS values when the baseline and after treatment values were compared, which indicated improvement due to treatment. ($P<0.05$).

Conclusions: We concluded that in patients with ATM, rehabilitation of patients contributes to clinical and functional improvement of the disease.

OP018

BOTULINUM TOXIN TYPE A IN THE TREATMENT OF CHILDREN WITH SPASTIC CEREBRAL PALSY

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Objectives: To evaluate the efficacy of BTX-a in the reduction of spasticity in children with the spastic cerebral palsy.
Methods: Forty children with spastic cerebral palsy, aged between 2 and 12 years, were included in the study. BTX-A was injeced into gastrocnemius muscle (14 children) and adductor longus (40 children). They received 20 units/kg Dysport. All patients were treated the same way before and 1 month after BTX-A (clinical examination, dorsiflexion goniometric measuring of ancle joit and knee-distance test, EMG, X-rays of hip, video recording).
Results: BTX-A reduces spasticity in all treated patients. Both passive and active dorsiflextion of ancle joint increased. Maximal abduction (the distance between knees) had increased also. Statistical analysis was by Students t-test-significance at $p<0,01$.
Conclusion: BTX-A reduces spasticity in all treated patients with spastic cerebral palsy. Reduction of spasticity by BTX-A allows a child to work on more efficient way of moving and minimizes contracture. It also prevents progressive hip subluxation and reduces the need for surgical treatment.

OP019

DYNAMIC POSTURAL STABILITY IN BLIND ATHLETES USING THE BIODEX STABILITY SYSTEM

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Objectives: Three systems affect the upright standing posture in humans -- the visual, vestibular, and somatosensory. Visually impaired individuals have bad postural balance. However, as we know, some sports can improve postural balance. Therefore, we aimed in this study to evaluate the dynamic postural stability in goal-ball athletes.
Methods: Twenty blind goal-ball players and 20 sighted controls were evaluated using the Biodex Stability System (BSS). Three adaptation trials and three test evaluations (a 20-second balance test at a platform stability of 8) were applied to the blind athletes, and to the sighted with eyes open and closed. Dynamic postural stability was measured on the basis of three indices: overall (OA), anteroposterior (AP) and mediolateral (ML). Means of each test score were calculated. We compared the tests results between the blind athletes and sighted (with eyes open and closed) subjects.

	Overall index	Anteroposterior index	Mediolateral index
Blind athletes	6.22±1.92	4.20±1.35	4.47±1.24
Sightes (eyes closed)	4.71±1.55	3.18±0.99	3.58±1.29
Sightes (eyes open)	1.57±0.45	1.19±0.34	1.23±0.35
p value	0.000	0.000	0.000

Results: There were significant differences among the results of blind athletes, and sighted subjects with regards to all three indices (OA, AP, and ML). Dynamic postural stability was demonstrated to be affected by vision; even stability of the sighted subjects with eyes closed was better than that of the blind athletes.

OP020

MEASURING THE QUALITY OF WEIGHT BEARING IN PATİENTS WITH HEMIPARESIS

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Objectives: Measuring the weight bearing by using a force platform makes easier to quantify the results of the assessment and treatment. Recently there are several study investigating of weight bearing in case of hemiparesis. Non of these studies has mentioned the quality of these kinds of movements or postures. Our aim was to find a way to determine the quality of weight bearing (WB) in patients with hemiparesis.
Methods: Measured ten patients with hemiparesis and ten healthy subjects. The subjects had to do weight transference from one side to another in standing position and they had to keep the weight of the body at each side for 5 seconds. We analyzed the patients posture during WB at each side using two force platforms and a video tape. Five reference points were marked out on the patient's back and we measured the angle and the distance between these points.
Results: Our results showed that most of the patients were not able to keep the weight on the hemiparetic side in a good manner comparing to the healthy subjects. According to the normal movement the trunk alignment based on the angular measurement were different from the normal persons' rates. Our results also pointed out that the WB is not good neither on the affected nor the unaffected side.
Conclusions: Our results suggest that the good amount of weight on hemiparetic side does not mean a good quality. What's more most of the patients used some compensatory strategy to take the weight to the affected side and also to the unaffected side. The results justify that the therapists can not be satisfied if the patients has enough weight on their hemiparetic side but we have to pay attention to the quality too and also have to differ the active weight bearing from the passive one.

OP021

IS KNEE JOINT PROPRIOCEPTION AFFECTED BY LOCALIZED MUSCLE FATIGUE AND OSTEOARTHRITIS?

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Objectives: To investigate the effects of osteoarthritis and localized muscle fatigue both in patients with knee osteoarthritis and in normal controls. Osteoarthritis affects not only the cartilage and subchondral bone, but also all elements involved in proprioception (muscles, tendons, joint capsule, ligaments, menisci, skin), leading to progression of degeneration.

Methods: Fifty patients, 39 women and 11 men, with bilateral osteoarthritis of the knees, ages ranging between 45 and 75 years (60.2±8.4) were examined. Sixteen (3 men, 13 women) healthy, age-matched subjects were selected as the control group. Proprioceptive accuracy was quantified as the) during passive°subjects'ability to replicate a target knee joint angle (45 flexion-extension of the knee while sitting on the bench of a computerized isokinetic dynamometer with inflated air splints on the ankles to minimize cutaneous sensation. Reposition error was defined as the difference between the target angle and the reposition angle, the absolute value of this error was used in statistical analyses. The reliability test of the protocol proved it to be reliable. Both subjects and controls were asked to replicate the target angle again after a moderate exercise on the cycle ergometer.

Results: Isometric strength of the quadriceps muscles was less in the patient group. Proprioceptive accuracy did not correlate with the strength of quadriceps and hamstring muscles and their ratio, age, sex and body mass index in both the patient and control groups.

Conclusions: Osteoarthritis and a fatigue generating moderate cycling exercise do not affect joint position sense. Knee joint position sense is significantly associated with the degree of osteoarthritis, while it is not correlated with severity of pain and joint instability.

OP022

EARLY CYCLING TEST AS A PREDICTOR OF WALKING PERFORMANCE IN STROKE PATIENTS

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Objectives: To determine the relative contribution of early constant rhythm legs cycling test to walking performance and to assess the predictive value of cycling test soon after a stroke in determining the long-term level of walking performance three and six month post the event.

Design: Single groupe (N=44), at the beginning of rehabilitation cycling test, at three month post event evaluation of walking performance. Setting in patient rehabilitation.

Subject: Patients after a first stroke main measures independent variable: ability to cycle at constant rhythm of 50 rps, without and with resistance, lower extremity motor strength (LEMS) and walking function (WF) scored by the Scandinavian Stroke Scale (SSS). Dependent variables: gait velocity, distance and stair climbing at three-month post event.

Results: Multiple linear regression analysis demonstrated that rhythmic, constant cycling is the best predictor of walking velocity (r^2=0.4), gait distance (r^2=0.2) and number stairs climbing(r^2=0.26). LEMS and WF had no additional separate contribution to prediction of study outcomes.

Conclusions: Conclusions The inability to cycle at a constant rhythm for one minute two weeks post event is more significant contributor than LEMS and WF to walking performance three month post stroke.

OP023

DXL AND DXA CAN COMPARABLY DISCRIMINATE PATIENTS WITH OSTEOPOROSIS

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Objectives: Dual Energy X-Ray Laser Measurement of Calcaneal Bone Mineral Density (DXL) technique have been shown to be as good as bone mineral density (BMD) assessed by dual-energy X – ray absorptiometry (DXA) in predicting fracture risk: DXL could increase substantially the accessibility to a reliable bone osteoporosis risk evaluation , but little is know regarding the relationship of DXL to risk factors. The aim of the study that using a T- score threshold of –2.5 for heel measurements by DXL technology was compared to dual-energy X – ray absorptiometry (DXA) measurements at femur-spine and was to evaluate the relationship between the most relevant risk factors for osteoporosis and DXL .

Methods: We studied 2884 women between 40-90 years old, who live in Ankara ,Turkey. All participants were questioned on lifestyle habits and on their medical history. BMD measurements were done with DXL (Calscan). The patients whose T-score ≥ -2.5 on DXL underwent to DXA(Hologic).

Results: 9.09 years; mean height, ±The mean age of 53.38 6.3±11.9 kg; and 29.5±6.3 cm; 74.6±bodyweight, and bodymass index were; 1,59 kg/m2 , respectively. Educational and socioeconomical levels were low . These women's dressing style were covered (85.1%) and most of them were housewives 5.59, ±1.35 and 45.8±(93.9%). Mean menarche age and menaupose age were 13.8 6>respectively. Most of them had three children (26.5%), breast feeding time months (77.6%). The ratio of birth control pill use was 22.6% and 15.5% were given hormone replacement therapy (HRT) after their menaupose.A few of the women (21.4%) heard the name of the disease and only 14.3% had enough information about osteoporosis. The most common concomitant diseases in this study group were hypertension,(19.3%) and Diabetes mellitus (11.1%), Thyroid disease (6.3%) and osteoarthritis (6.3%). Continued drug use among our study population was 17.4%. The ratio of women who had hysterectomy and / or oopherectomy was 16.3%. The ratio of women who had history of one fracture was 18.3%. Only 11.0% of them perform regular exercises. Using a T- score threshold of –2.5 for heel measurements by DXL: osteoporosis were 13.4% and osteopeni were 60.1%. According to DXA measurements osteoporosis ratio were 55%, and 17% in the lumbar spine and femoral neck. The sensitivity and specificity for osteoporosis for the DXL measurements were calculated assuming a low T-score at the spine and or femoral neck as the criterian for a correct diagnosis. The sensitivity was found to be 60% for osteoporosis and the specificity was 73%. T- score threshold of –2.5 for heel measurements by DXL was significantly related with bone mineraly density 0.001), age, menaupose age, menarche age body mass index (BMI), <(BMD) (p 0.001), <hormone replacement therapy (HRT) (p=0.031), educational level (p 0.001), <covered dressing style (p=0.001), dairy tea and coffee consumption (p 0.001), family fracture history<outdoor physical exercise, fracture history (p0.001).<0.001), chronic systemic diseases (p<(p=0,021), smoking.

Conclusions: We observed that osteoporosis and osteopenia was a serious and chronic disease in Turkish women, especially who had covered dressing style. DXL technique has good potential for

screening osteoporosis and diagnosis agrement with DXA. It can be used safely, rapidly, easly in determining fracture prediction capability in Turkish women.

OP024

THE EFFECT OF VOJTA THERAPY ON MOTOR FUNCTIONS OF CHILDREN WITH EARLY CEREBRAL PALSY

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Objectives: Cerebral palsy(CP) is a permanent disorder of muscle tone, posture and movement that occurs in the immature brain as a result of non progressive lesions. Infants with CP face disability in motor, sensorial, cognitive and metabolic functions. Management of these infants poses much difficulty and requires great effort starting from birth. Although various treatment options can be utilized as indicated, rehabilitation program constitutes the fundamental treatment strategy. Neurodevelopmental treatment methods have an important role among rehabilitation alternatives.

Methods: In our study, we investigated the effect of Vojta therapy on motor functions of children with early CP, aged 0-12 months. For this purpose, 35 patients diagnosed as CP, 19 being in the Vojta therapy group and 16 in the conventional exercise (CE) group were evaluated. Each therapy method was taught to the parents by a trained physiotherapist and both treatment groups were at home. The effects of these treatments on motor functions were evaluated by Gross Motor Function Measure(GMFM) and difference between physiological and motor age. All patients were scored according to age-matched GMFM subgroups at initial assessment, 3, 6, 9, 12 months and these results were then compared between the two treatment groups. Physiological-motor age differences were compared between groups at the beginning and within group changes were analyzed at the end of treatment. Moreover, since Vojta therapy requires family participation, Beck Depression Scale(BDS), compliance to the treatment, educational status of mothers and economical status of families were also evaluated.

Results: While there was no significant difference in GMFM values between the two groups at the beginning and 3rd. month, there was statistically significant increase in GMFM values of Vojta group when compared to CE group at 6, 9, 12 months($p=00.3$, $p=0.004$, $p=0.01$ respectively) . While the difference between physiological and motor age values significantly decreased in Vojta group ($p=0.04$) at the end of the treatment, significant increased was noted in the CE group ($p=0.03$). Although evaluation of compliance of the families to the treatment revealed no significant difference, motivation of the Vojta goup to the treatment was better than the CE group. There was no significant difference in the comparison of the economical status of families, BDS and educational status of mothers.

Conclusions: As a result, Vojta therapy can be alternative modality to other rehabilitation methods since it is applicable as an early intervention, can be taught to the parents easily, can be applied at home and has positive effects on rough motor functions. Controlled trials with greater number of subjects and long term follow-up are needed to support effectiveness and investigate mechanisms of the action of Vojta therapy.

OP025

OBSTACLES TO DISCHARGE OF VENTILATOR-ASSISTED CHILDREN FROM THE HOSPITAL TO HOME

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Objectives: There is a growing cohort of chronically disabled but medically stable children whose lives depend on ventilator assistance. This is due in part to advances in ventilator technology, a change in societal expectations of long term disability, and increased survival but incomplete recovery from resuscitation and intensive care. There are considerable psychological and developmental disadvantages to long term hospital based care. Increasing emphasis is being placed on measures to transfer these children home Disappointingly, some ventilator dependent children remain hospital bound, often in an intensive care environment. The aims of this study are to describe the characteristics of children attain to a respiratory rehabilitation department, and to identify the factors that contributed to a delay in hospital discharge from time that medical stability was achieved.

Methods: We reviewed the all records of ventilator-assisted children (N=39 children, age 5.6 +/- 5.2 [SD] years at admission) who achieved medical stability situation after 7 month of hospitalization (range, 1 to 24 month).

Results: The length of the hospitalization from that time until discharge or time of the survey was 4.5 month (range, 1 to 17 month). 15 ventilator-assisted children were discharged to their natural parents homes, two were discharged to foster care and 5 were institute in other hospital department. A significant negative connection was found between socio-economic status of family and remaining in the respiratory rehabilitation unit ($p<0.05$). Having another handicap family member found corelated positively to prolong sustain in the department.

Conclusions: In summary, ventilator-assisted children often remained hospitalized for prolonged periods of time, after they were medically stable, mainly for nonmedical reasons.

OP026

NORMAL VALUES FOR CALCANEAL QUANTITATIVE ULTRASONOMETRY IN HEALTY TURKISH SCHOOL CHILDREN (AGED 7 TO 14 YEARS); RELATION OF STIFFNESS TO AGE, PUBERTAL STAGE AND ANTHROPOMETRIC CHARACTERITICS

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Objectives: Bone density in children is a relatively new topic of interest within the field of osteoporosis. In children, bone density measurements are important for the assessment of disease on bone mass.Quantitative ultrasonometry (QUS) is attractive for children, since the technique is radiation-free, and the devices used are portable and cheaper than radiation-based equipment. The purpose of this cross-sectional study was first to establish an age-dependent refference range for stiffness at the calcaneus in the children and second to determine the influence of body weight, height, body mass index (BMI) and foot dimensions on QUS parameters.

Methods: QUS parameters were measured in 1618 healty schoolchildren (811 boys, 806 girls) between 7 and 14 years old randomly selected from the İzmir Metropol (TURKEY). The participitans were recruited from 51 primary school. All children who suffered from diseases or used any drugs known to affect bone metabolism were excluded from the study. Tanner stages were evaluated through self-assesment method. Ultrasound parameters of the dominant heels were measured with the LUNAR sonometer. The statistical analyses were performed using SPSS (9.0 version) for Windows. Pearson product moment correlation coefficent were calculated to examine the relationship between the anthropometric

parameters and the stiffness. Spearmans correlations were used to determine whether a relationship between Tanner stage and stiffness. Linear regression models were used to determine the most appropriate regression equations for stiffness and age.
Results: There was no statistical significant difference between groups regarding to age, BMI, T-score and stiffness. Boys were heavier, were taler and have a bigger foot-size than girls (p<0,005). Stiffness increased significantly with age, weight, height, foot-size and BMI in both girls and boys (p<0,000). In boys age and foot-size were independent predictors for stiffness. In girls weight, height and BMI were independent predictors for stiffness
Conclusions: In conclusion stiffness increased significantly with age in both sexes.

OP027

DEMOGRAPHIC DATA COLLECTED FROM ACUTE REHABILITATON CLINIC OF TAF

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Objectives: Spinal cord injured ,stroke or traumatic brain injury patienets which came to a stable position after teir surgical or medical treatment , their rehabilitation process starts at the acute care units of the rehabilitation centers. In our country there is only one unique acute care clinic and it is in the TAF Rehabilitation Center. Our clinic has 32 bed capacity and works in the 60-80 fulfilled percentage.
Methods: In our study we tried to evaluate the demographic datas of the patients which stayed and had medical theraphy in our clinic between January 2003 and January 2004. after this demographic datas we tried to analize the cost of a patient per day in our clinic.
Results: In our clinic we treated 114 patients between January 2003-January 2004.The approximate treatment day of a patient is 51 days. The number of patients which had SCI was 93 (%81.5), stroke was 13 (%10.5), and TBI was 8 (%7) . The median price of a SCI patient was 90.220.000 TL (~ 66$) ,stroke patient was 136.522.000 TL (~101$),and TBI patient was 95.753.000 TL (~70$).

OP028

IMPACT OF BLADDER MANAGEMENT METHOD ON SOCIAL PARTICIPATION OF PATIENTS WITH SPINAL CORD INJURY

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Objectives: Clean intermittent catheterization (CIC) has been proposed to be the safest method in terms of preserving bladder compliance and preventing urological complications. This study examines the social participation (handicap) among individuals with spinal cord injury (SCI) using indwelling catheter (IC) for bladder management vs. those using clean intermittant catheterization (CIC) for at least two years.
Methods: Twenty-two patients with SCI, using predominantly indwelling catheter (IC) for bladder management for at least two years, were matched on age, duration of disability and level of injury with the 22 SCI patients on CIC. Craig Handicap Assessment and Reporting Technique (CHART) was used to measure social participation of the subjects. Besides demographic and clinical characteristics, social integration, mobility, occupation, physical independence, cognitive independence and economic self–sufficiency subscores of the two groups were compared.
Results: Mean (SD) age and disease duration of the subjects were 32.1(9.4) and 3.6(1.1) years, respectively. Ten percent had cervical, 50% had toracic and 40% had lumbar or sacral level of injury. The difference between the groups in terms of female gender was statistically significant (18 vs 10) in the favor of IC group. Subjects on CIC reported greater handicap than patients on IC in the areas of physical independence, social integration, mobility and occupational functioning (p<0.05). However, groups did not differ in the areas of cognitive independence and economic self- sufficiency. Female SCI patients on CIC had greater difficulty in creating new social relationships and spent less hours out of house. None of the female patients on CIC was working in a paid occupation or going to school.
Conclusions: Despite well known advantages of CIC on renal function and bladder itself, focusing on health-related quality of life, we should search for new bladder management programs in the favor of both renal functions and social participation.

OP029

THE RELIABILITY STUDY OF TURKISH ADAPTATION OF QUALITY OF LIFE INDEX-SPINAL CORD INJURY VERSION

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Objectives: The aim of this study was to gain the Turkish adaptation of Quality of Life Index-Spinal Cord Injury version which can be used in spinal cord injured people, and to assess the reliability of this adaptation.
Methods: The Quality of Life Index-Spinal Cord Injury version has two parts consisting of 37 questions each. In part 1, the satisfaction in different aspects of life was interrogated while in part 2, the importance of the same areas was interrogated. The translation procedure was performed according to the cross cultural guidelines and the translated index was applied to 75 spinal cord injured. Patients were assessed with the index for two times with an interval of one week.
Results: The internal consistency of the index was found to be =0,93 for the first and second applications respectively. Theα=0,91 and α item-total correlations were between 0,0887-0,7498 in the first application, whereas they were between 0,0683-0,7353 in the second application. The correlation analysis of the item scores of both applications showed that there were statisticaly significant correlations (p>0,05) in all item scores except 15th and 25th items.
Conclusions: In conclusion, the Turkish adaptation of Quality of Life Index-Spinal Cord Injury version was found as reliable in this study.

OP030

EARLY RESULTS OF TREATMENT WITH METHOTREXATE OR LEFLUNOMIDE IN RHEUMATOID ARTHRITIS PATIENTS

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Objectives: Leflunomide (LEF) is a novel disease-modifying anti-rheumatic drug (DMARD) indicated for treatment of rheumatoid arthritis (RA) in adults. We evaluated the early results of treatment conventional DMARD methotrexate (MTX) or LEF in RA patients.

Methods: Thirty-six patients were retrospectively divided into two groups. Group I consisted of 20 patients (mean disease duration 10.1 years) with RA treated with MTX 7.5 mg/weekly base. Group II consisted of 16 patients (mean disease duration 8.1 years) with RA treated with LEF 20 mg/day dose. Both groups fulfilled the American College of Rheumatology (ACR) criteria for RA and were clinically active. The patients were followed for a period of six months. Efficacy was assessed by pain score (VAS), tender and swollen joint counts, the Disease Activity Score 28 (DAS28) and the Health Assessment Questionnaire (HAQ). Safety was monitored by regular physical examination, blood tests and recording of adverse events (AE). We compare the efficacy and AE in both groups.

Results: As compared to baseline, a significant improvement were observed in VAS ($p<0.01$) and DAS28 ($p<0.001$) at month 6 in group I. As compared to baseline, a significant improvement were observed in VAS ($p<0.005$), DAS28 ($p<0.005$) and HAQ ($p<0.05$) at month 6 in group II. No significant differences were seen between the two groups in terms of efficacy parameters and AE. No severe AE were seen.

Conclusions: Our data suggest that treatment with MTX and LEF were both effective and safe on the short-term. However no statistic differences were seen between both groups, neither of efficacy or AE. Although long term analyses are required, according to these findings LEF appears to be a safe treatment option for RA, demonstrating an efficacy and safety profile similar to MTX.

OP031

GAIT CHARACTERISTICS OF PATIENTS WITH ANKYLOSING SPONDILITIS

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Objectives: To analyze gait deviations and its associations with disease characteristics and physical functioning of patients with ankylosing spondylitis (AS) and to improve clinical practice through applying the findings into current treatment principles and novel interventions.

Methods: Forty-three AS patients (7 women, 36 men) with a mean±SD age and disease duration of 39.1±8.5, and 15.7±8.9 years, respectively, were enrolled into the study. Disease activity (the Bath Ankylosing Spondylitis Disease Activity Index, BASDAI), function (the Bath Ankylosing Spondylitis Functional Index, BASFI), mobility (the Bath Ankylosing Spondylitis Metrology Index, BASMI) and hip involvement (Bath Ankylosing Spondylitis Radiology Hip Index, BASRI-hip) of the AS patients were documented. Time-distance (velocity, cadence, stride time and length), kinematic (joint rotation angles of pelvis, hip, knee and ankle in sagittal, coronal and transverse planes) and kinetic gait characteristics (ground reaction forces, moments and powers of hip, knee and ankle) were analyzed using VICON 370 computerized gait analysis system and compared with 20 age-sex matched normal control subjects.

Results: Patients with AS revealed significant decrease in step lenght, hip flexion at heel contact, hip abduction at swing, knee extension at stance, pelvis, hip, knee and ankle total excursions in sagital plane, peak ankle power, vertical ground reaction force (GRF) at heel contact, however, double support time, ankle dorsiflexion at preswing, hip flexor and internal rotation moment were higher than normal controls ($p<0.05$). Interpretation of the findings showed that limited hip flexion at heel contact was the primary factor behind the gait deviations. Hip flexion angles at heel contact and hip flexion and rotational moments were significantly correlated with total BASDAI ($rs=0.394$, $p<0.026$), BASFI ($rs=0.325$, $p<0.034$) and BASRI-hip ($rs=0.394$, $p<0.043$) scores.

Conclusions: Limited hip mobility is the main impairment leading to disability, together with medical treatment, interventions focusing on hip kinematic and kinetics may improve physical functioning in patients with AS.

OP032

COMPARISON OF SPLINTING, SPLINTING PLUS LOCAL STEROID INJECTION AND OPEN CARPAL TUNNEL RELEASE OUTCOMES IN IDIOPATHIC CARPAL TUNNEL SYNDROME

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Objective: To compare the efficacy of splinting (S), splinting plus local steroid injection (S+LSI) and open carpal tunnel release (OCTR) in mild or moderate idiopathic carpal tunnel syndrome (CTS).

Methods: The patients who have symptoms of CTS at least 6 months are included. Exclusion criteria were; underlying metabolic disorders, previous distal radius fracture, prior CTS treatment, and medical conditions that can affect the management responses. Patients were evaluated at baseline, 90th day and 180th day after treatment. Follow-up criteria were: electromyography (EMG) findings, Boston Questionnaire (BQ). The difference of outcome measure between baseline and post- treatment scores at 90th and 180th day for each subject was computed by general linear model repeated measures with SPSS 10.0 statistical software package. The level of statistical significance was set at $p< 0.05$.

Results: 36 patients and 57 hands completed the study. 23 hands had been splinted for three months, in 23 hands steroid injection were applied for one time and then had been splinted for three months, and 11 hands were operated. In EMG parameters and BQ symptom severity score statistically significant improvements were found and none of the treatment method was found superior to other by using general model. In BQ functional capacity score statistically significant improvement was found ($p<0.001$), and this difference was effected by treatment method ($p=0,03$). At 90th day reduction in the functional capacity scores were seen in all methods and none of methods was superior, but at 180th day however reduction in OCTR group was continuing, in S and S+LSI groups increasing in the scores were observed.

Conclusion: All treatment methods were shown as effective at 90th day, but OCTR was superior method especially in BQ functional capacity at 180th day. The effects of local steroid injection and splinting were found temporary in many hands.

OP033

THE VALUE OF "ANTI-CYCLIC CITRULLINATED PEPTID" IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objectives: Current therapeutic strategies of rheumatoid arthritis (RA) includes agressive antirheumatic therapy in an early phase of

the disease. For this reason, early diagnosis of the disease is important. Rheumatoid factor (RF) is still the most important serological marker for the diagnosis of RA, however recent results have shown that antibodies to cyclic citrullinated peptide (anti-CCP) found highly specific for diagnosis of the disease. The aim of this study was to evaluate the value of anti-CCP in RA, including the early form.

Methods: Forthy-six patients (41 women, 5 men) who fulfilled the 1987 revised American Rheumatism Association criteria for RA were enrolled in this study. Twenty healthy subjects (18 women, 2 men) were included as a control group. Anti-CCP levels were measured using ELISA and IgM RF were measured using Nephelometry in both RA and control groups.

Results: In RA group, the sensitivity of IgM RF was 60.8%, and anti-CCP was 71.7%. Both tests had quite high and equal specificity (90%). Positive predictive values of anti-CCP and IgM RF were 94.3%, and 93.3%, respectively. The results of 10 RA patients whose the duration of the disease less than 1 year had analysed. In this group, the sensitivities of anti-CCP and IgM RF were found 60% and 40%, respectively.

Conclusions: Anti-CCP ELISA, which is a new method, had high specificity for the early diagnosis of RA. Additionally, this method is useful for distinguishing patients with RA from those without RA and for RF negative patients.

OP034

EFFECTS OF ISOMETRIC EXERCISE AND ELECTRICAL STIMULATION PROGRAM ON QUADRICEPS FEMORIS MUSCLE STRENGTH AND CLINICAL PARAMETERS IN THE PATIENTS WITH KNEE OSTEOARTHRITIS

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Objectives: The aim of this study was to evaluate the effects of biofeedback assisted isometric exercise and electrical stimulation program, on pain, disability and quadriceps strength in the patients with knee osteoarthritis.

Methods: Fifty women aged between 42 and 74 years, diagnosed as knee osteoarthritis according to American College of Rheumatology (ACR) criteria were participated in the study. Patients were randomized into two groups. Group I received biofeedback assisted isometric exercise, group II received electrical stimulation. Both of the programs were performed 5 days a week, for 4 weeks. Patients were evaluated before and after the therapy. Outcome measures for pain were visual analogue scale (VAS) pain score in activity, at night, at rest and Western Ontario McMaster osteoarthritis index (WOMAC) pain score. Disability and stiffness were assessed with WOMAC physical function and stiffness score. 1 RM (repetition maximum) and 10 RM were used for measuring quadriceps strength. In addition, 50 m walking time, 10 steps stairs climbing up-down time were evaluated.

Results: Both of the groups showed significant improvements in pain, physical function and stiffness scores after the therapy ($p<0.001$). There were statistically significant improvements in 50 m. walking time and 10 steps stairs climbing up-down time ($p<0.001$, $p<0.001$, respectively) and 1 RM and 10 RM values indicating the improvement in muscle strength ($p<0.001$, $p<0.001$, respectively). In addition there were no significant differences between the groups after the therapy ($p>0.05$).

Conclusions: In this study we obtained a decrease in pain and disability, improvement in muscle strength, walking interval and climbing stairs up-down in the patients with knee osteoarthritis by regular exercise and electrical stimulation therapy. We conclude that both of these therapies are beneficial in patients with knee osteoarthritis.

OP035

PEDOBAROGRAPHIC FINDINGS IN PATIENTS WITH KNEE OSTEOARTRITIS:

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Objectives: Pedobarography may be a useful tool to show disturbed weight bearing in knee OA. The aim of this study is to evaluate the pedobarographic findings and balance measures in knee osteoartritis.

Methods: Fourty-eight patients with knee osteoarthritis, and 30 controls were included in this study. Pedobarographic measures were obtained from all patients. Pain intensity was evaluated using the Visual Analog Scale(VAS). Percentage of the pressure on front foot, and on hind foot was determined using static pedobarography. We measured the peak pressures in front foot, mid foot and hind foot using dinamic pedobarography. For evaluation of balance , we measured the centre of pressure(COP) sway length, and sway width.

Results: The mean agesof gonartrotic group, and control group were 62.1±8.6, and 58.3±7.5; mean weight was 75.8±13.4 kg and 70.2±16.03 kg respectively. Both age and body weight were statistically similar.($p>0.05$). Percentage of right hind foot pressure in the patient group, and control group were 54.3±19.1kPa and 62.7±13.2 kPa respectively, being significantly lower in patient group.($p<0.05$). Peak pressure of right front foot in patient group during walking was significantly lower than the control group.($p<0.05$) Peak pressures of gonarthrotic and control groups were 28.85±6.36 kPa and 32.33±8.94 kPa respectively. Sway width in patient group was 2.86± 1.65 mm and was statistically higher than the control group whose sway width was 1.91± 0.67 mm.($p<0.05$). There was positive correlation between the weight of the patient and peak pressure of mid foot during walking.($r=0.402$, $p<0.001$) Sway length and width were positively correlated.($r=0.786$, $p<0.001$). In patient group, VAS during rest was negatively correlated with peak pressure of both right and left hind foot.($r=-0.327$, and $p<0.05$ and $r=-0.355$,$p<0.05$ respectively). In patient group, grade of osteoarthritis was positively correlated with sway length ($r=0.286$, $p<0.05$) and with sway width ($r=0.313$, $p<0.05$).

Conclusion: According to our findings; percentage of right hind foot pressure during standing and peak pressure of right front foot during walking was lower; and sway width was higher in patients with knee OA. Patients with high level of pain had low peak pressure in hind foot. Pedobarography may become a useful technic to determine foot pressures and balance problems in knee osteoartritis, and can be used for patient evaluation.

OP036

DEPRESSION IN FIBROMYALGIA SYNDROME

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Objective: Fibromyalgia Syndrome (FS) is a chronic musculoskeletal syndrome characterized by diffuse pain, fatigue, sleep disturbances, headaches, cognitive disturbances, depression and anxiety. In this study, it was aimed to evaluate the frequency of depression in FS, and its relation with demographic qualifications.

Methods: Seventy four women having the diagnosis of FS, and 56 healthy female without FS were included in the study. Beck Depression Scale(BDS) was used to evaluate depression.
Results: Mean age of FS patients and the healthy group were 42.1±9.8 (21-68 years) and 42.4±13.3 years respectively; which were statistically similiar ($p>0.05$). Seventy three percent of the patients were married and 52.7% were housewife. The two groups were similiar in maritual status, occupation, mean year of education, marriage among relatives, and occupation ($p>0.05$). Mean BDS scores of FS patients and healthy group were found 16.6±8.8 and 11.9±6.2 respectively, the difference was statistically significant ($p<0.01$). According to BDS scores, 75.8% of FS patients were found to have depression, 40.3% having minor (score 10-18), 30.6% moderate (19-29), and 4.9% severe (≥30) depression, however the control group revealed minor in 50%, and moderate depression in 11.5%($p<0,05$). There was a negative correlation between BDS scores and patients' total year of education ($r=-0.285$, $p=0.025$). Patients who had marriage among relatives, and who were demonstrating sleep disorders had higher scores of BDS ($p<0.05$).
Conclusion: Depression is present in the majority of FS patients and might be correlated with different parameters such as education level, marrital status, and sleep disorder. It is suggested that these factors should be taken into consideration in the diagnosis and follow-up of the FS patients.

OP037

THE CLINICAL AND RADIOLOGICAL EVALUTAION OF TEMPOROMANDIBULAR DISORDERS RHEUMATOID ARTHRITIS: THE ROLE OF MYOFASCIAL PAIN DYSFUNCTION

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It has critical importance to discriminate the origin of pain due to myofascial and/or joint structures because of different therapeutic choices in rheumatology practices. The aims of this randomized controlled study are to point out the secondary myofascial involvement as a cause of temporomandibular joint (TMJ) pain in rheumatoid arthritis (RA) and to evaluate relationships between certain clinical and radiological criteria. Totally 89 patients (33 patients with RA, 26 patients with myofascial pain dysfunction (MPD) and 30 controls with lumbar discopathy) were included in this study. Twenty-three patients with RA (70%) had painful TMJ. Fifty-five percent of them had secondary myofascial pain dysfunction. While nearly all of our patients with RA (94%) had symptoms of temporomandibular disorders (TMD), and 70% of them had signs of TMD. It was detected abnormal TMJ findings in 58% of radiographs, and in 94% of high resolution computerized tomography (HRCT) images in patients with RA. Condylar head resorption, joint space narrowing and degeneration of TMJ statistically more prominent features in their HRCT of patients with RA compared with controls ($p<0.05$). The TMJ pain score on active palpation correlated with number of the mandibular subchondral cysts on HRCT ($r=0.6$, $p<0.05$).
In conclusion, the clinical and radiological findings of TMD are common. Patients with active RA should carefully follow-up for TMJ involvement. HRCT can be initial radiological tool for assessment of TMD in early cases. The myofascial structures are also important cause of TMD in RA.

OP038

GAIT REHABILITATION BY MEANS OF A NEW BODY-WEIGHT MEASURING SYSTEM.

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Objectives: Current methods for gait rehabilitation are directed towards instructing partial weight bearing (PWB) or to encourage full weight bearing (FWB) on an affected limb. In clinical practice it is possible to distinguish two groups of patients in need of gait rehabilitation. In the first group, controlled PWB is recommended after surgical fixation of a fractured lower limb bone, following unsuccessful joint replacement, after reconstruction of knee ligaments and in those patients with joint infection, sprain of the ligaments or stress fractures in the lower limb. In the second group of patients after lower limb amputation, cerebrovascular hemiparesis, THR or TKR, and in gait disorders due to muscle weakness for various reasons, FWB is encouraged. Ambulation with PWB or FWB is a sensorimotor skill taught by physical therapists. The current methods for gait rehabilitation are subjective and based on verbal instructions, use of full-length mirrors and bathroom scales. An objective and practical method of measuring correct weight bearing in such patients during ambulation does not exist. Objectives: To assess the validity of body weight measurements obtained during ambulation by comparing the results of a new body weight (BW) measuring system (SmartStep, Andante Medical Devices Ltd.) with those obtained from a commercially available force plate (Advanced Mechanical Technology Inc.).
Methods: Nine healthy subjects, mean age 26.4 ±3.8 yr, participated in the study and were fitted with a proper size insole. The SmartStep system consists of a light-weight inflatable insole, a control unit for calibration, data recording and delivery of a bio-feedback audio signal and PC software. Loading the lower limb during ambulation, increases the pressure in the insole pockets and thereby activating the relative pressure sensors. The resulting electric signals were stored in the control unit attached to the patients' ankles. Data were collected simultaneously from the insole and from the force plate. SmartStep and force plate data were analyzed using accuracy test, general linear models, Pearson correlation, as well as calculation of the absolute margin between the obtained data.
Results: Analysis of the SmartStep System and force plate results showed that the overall accuracy of the SmartStep was statistically significant ($p=0.004$) as well as correlation level ($R2=0.907$). These findings indicate that the SmartStep is extremely accurate as a predictor of force plate measurements. In addition, the SmartStep System was tested for the repeatability of the results. Standard error of mean proved that the SmartStep System could repeat the same results with a minimal standard deviation of 0.53 kg.
Conclusions: This study provides evidence of the validity of the SmartStep System for measuring body weight during ambulation. Since the SmartStep System also supplies an audio or vibrotactile feedback signal, it can be calibrated to provide a signal each time the patient is overloading or underloading his body weight on the affected lower limb relative to specified thresholds. Therefore, SmartStep System may be used as a useful clinical and practical tool in gait rehabilitation.

OP039

IN-PATIENTS SHORT-TERM GAIT REHABILITATION BY MEANS OF A NEW BODY-WEIGHT MEASURING SYSTEM.

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Objectives: The final goal in gait rehabilitation is the ability to ambulate independently and evenly loading body-weight (BW) over both lower limbs. Current methods for gait rehabilitation are mainly subjective and are based on: demonstration and verbal instructions given to the patient by the physical therapist, patient self-observation and training in front of a full-length mirror and standing on a bathroom scale in order to feel the desired BW to be loaded during ambulation. Patients admitted for short-term Orthopedic Rehabilitation are often allowed and recommended to FWB gait over the affected leg. Among them, patients following joint replacement, fractures in the lower limb and amputees. Objectives: To evaluate the ability of a new BW measuring system in enhancing weight loading over the affected leg by means of bio-feedback audio signals, given during gait rehabilitation.

Methods: 42 in-patients in the Orthopedic Rehabilitation Dept. were randomly divided into subject and control groups. The mean age and body weight were, 62 ±12 years and 76 ±15 kg in the subject group and 66 ±15 years and 70 ±13 kg in the control group. The diagnoses of the participants were THR, TKR, fixation of a femoral neck fracture, BK and AK amputation. Quantitative evaluation of BW bearing over the affected leg was performed by means of a new BW measuring system (SmartStep, Andante Inc.). This system consists of a light-weight inflatable insole, a control unit for calibration, data recording and delivery of a bio-feedback audio signal and PC software. In a pre-test, all participants were fitted with a proper size of the new insole and were instructed to walk at their own selected speed. The amount of BW bearing (in kg) that was measured in the affected leg during ambulation (with or without walking aid), was considered as the base-line result. In the subjects group: following the pre-test, the SmartStep was calibrated in order to produce an audio signal each time the subject was loading the affected leg with the measured base-line weight + 10% of his BW. In the control group: following the pre-test, the physical therapist instructed the patient in how to load better the affected leg during the test itself.

Results: Data obtained in both groups (in kg) during the pre-tests and during the gait tests was converted into percentage of the participant BW. The means of the differences between the pre-test results and the gait test results in both groups were 11.1 ±7.7 % and 1.0 ±3.5 % in the subject and control groups, respectively. These differences were found to be statistically significant (p=0.00023).

Conclusions: The new SmartStep system was proved to be an important tool in assisting in gait rehabilitation since its bio-feedback system enhances and improves BW bearing over the affected leg in cases where FWB is recommended.

OP040
RELIABILITY OF QUANTITATIVE STATIC AND DYNAMIC BALANCE TESTS ON KINESTHETIC ABILITY TRAINER AND CORRELATION WITH CLINICAL BALANCE TESTS

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Objectives: To assess reliability of static and dynamic balance tests performed using Kinesthetic Ability Trainer (KAT), and to determine the correlation of these balance tests with Berg Balance Scale (BBS), Timed Up and Go Test (TUGT), Four Square Step Test (FSST) and Timed Single Leg Stance Test (Eyes closed) (TSLST).

Methods: Thirty-one healthy women volunteers between 40-51 years (mean age: 44.0 years) participitated in this study. Balance of all subjects were assessed with static and dynamic balance tests on kinesthetic ability trainer, Berg Balance Scale, Timed Up and Go Test, Four Square Step Test and Timed Single Leg Stance (Eyes closed). After completing all tests, subjects who volunteered for a second test on kinesthetic ability trainer were retested after 3 weeks (n=18).

Results: There was statistically significant correlation between static balance test on KAT and BBS ($r=-0.76$, $p<0.01$), TUGT ($r=0.53$, $p<0.01$), FSST ($r=0.41$, $p<0.05$). The correlation between static balance test and TSLST was not statistically significant. There was weak correlation between dynamic balance test on KAT and BBS ($r=-0.37$, $p<0.05$). No correlation was observed between dynamic balance test and other clinical tests. Test-retest reliabilities of static and dynamic balance tests on KAT were high ($r=0.85$ and $r=0.76$ respectively).

Conclusions: The reproducibility of static balance test and correlation of it with clinical balance tests were higher than dynamic balance test on KAT. Dynamic balance test may be reserved for younger patients with higher sportive skills. Static balance test on KAT proved to be a reliable quantitative evaluation method for stabilitiy in the patient population involved in PM&R practice.

OP041
COMPARISON OF QUALITY OF LIFE AND LIFE SATISFACTION IN PATIENTS WITH RHEUMATOID AND PSORIATIC ARTHRITIS

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Objective: Both rheumatoid arthritis (RA) and psoriatic arthritis (PsA) have a negative impact on patients' quality of life (QOL). The aim of this study was to compare QOL and life satisfaction in patients with RA and PsA.

Methods: Twenty patients with RA and 20 patients with PsA were included to the study. Demographic data and clinical characteristics including age, sex, disease duration, ESR, CRP, peripheral pain assessed by VAS and Larsen scores of hand x-rays were recorded. Nottingham Health Profile (NHP) was used used to evaluate QOL and Life satisfaction index (LSI) was used to measure psychological well-being in both groups.

Results: There was no statistically significant difference between RA and PsA patients, regarding age, sex and disease duration. The inflammation markers including ESR, CRP, pain by VAS and Larsen scores were significantly higher in RA patients. The scores of LSI were similiar between the groups. Although the scores of physical domains of NHP (pain and physical disability) were statistically higher in RA patients ($p<0.05$), the scores psychosocial subgroups of NHP were similiar between RA and PsA patients ($p>0.05$).

Conclusions: In conclusion, peripheral joint damage, inflammation and physical disability are significantly greater in RA but psychosocial reflection of QOL and life satisfaction are same for both groups; which can be explained by the additional burden of skin disease in patients with PsA.

OP042
ASSESSMENT OF COMPLIANCE WITH RALOXIFENE IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS OR OSTEOPENIA: AN OBSERVATIONAL STUDY – EVOS (EVISTA OSTEOPOROSIS STUDY): AN INTERIM REPORT OF THE 6 MONTH COMPLIANT PATIENTS

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On behalf of the EvOs Study Group

Objective: This study was designed as a multicenter, prospective and longitudinal observational study to assess primarily the compliance, secondarily the efficacy, safety and tolerability of raloxifene in a large group of postmenopausal women with osteoporosis/osteopenia in Turkey.

Methods: Postmenopausal women with high risk of osteoporotic fractures, who were assigned to receive raloxifene, were included into the study. Patients with intolerable vasomotor menopausal symptoms, or had a contraindication for raloxifene was excluded from the study. At the baseline evaluation, demographical data, medical history, drug use, and risk factors, physical examination and selected laboratory, DEXA, and radiological test results were recorded. After the baseline visit, patients were planned to be evaluated at the 6^{th} and 12^{th} months of treatment for the follow-up examination.

Results: Baseline characteristics: The mean age, and menopause age of the 1134 patients from 33 clinics who were compliant at 6 months, were 57.6±7.2 (34-81), and 46.0±5.5 (19-65) yrs, respectively. Osteoporosis was diagnosed 1.7±2.4 (0-23) years before enrollment into the study. Patients' mean height was 157.7±6.3 cm at baseline, but was reported to be 159.5±5.6 cm at 30 yrs of age. Regarding risk factors for breast carcinoma, 6.4% had a history of fibrocystic breast disease, 4.9% had no history of pregnancy, 5.1% had an increased density at mammography, 4.2% had a family history of breast cancer and 2.7% had a history of previous biopsy of breast. Most common risk factors for osteoporosis were: early menopause (29%), age>65 (18.2%), slender build (17.8%), family fx history (8.9%), history of fx after age 40 (6.8%). There was a fracture history of a total of 111 patients (9.8%). Among all reported fractures, 5.3% was related to vertebrae whereas complaint of back pain was present in 50.8% of all patients. Of the patients with previous osteoporosis, 33.3% have been treated with calcium, 19.0% with alendronate, 19.0% with HRT, 18.7% with vitamin D, 14.5% with calcitonin, and 2.8% with risedronate. The reason for discontinuation of previous treatment was ineffectiveness of the treatment in 15.0%, noncompliance in 14.3%, adverse events in 9.5% and other reasons in 13.1%. The treatment has been changed because of gastrointestinal complications in 37.9% and vaginal bleeding in 8.5% of the cases. Hot flushes were reported in 41.7% of the patients and this complaint was mild in 75.2%, moderate in 19.2% and severe in 5.6% of these cases. The vital signs were within normal limits. Hypercholesterolemia was present in 39.9% of the patients.

6th month visit: At the 6th month follow-up, only 10.9% of the patients from the 1615 patients at baseline had withdrawn the study medication because of adverse events (49.2%), poor compliance (37.9%) and other causes (19.4%). The others who were lost to follow-up were either due to study center or patient record noncompliance. No adverse events had been experienced in 94.1% of the patients under raloxifene treatment. Of the 67 adverse events, 50.7% were general (e.g. vasomotor symptoms, peripheral edema, weight gain). Hot flushes were reported by 41.1% of the patients, 69.2% of which were mild, 20.4% moderate and 10.4% severe. There were no venous thromboembolism events. Regarding only the patients compliant at the 6 month visit, the number of patients with hot flushes, blood pressures and pulse rates were not significantly different at 6th month visit compared to baseline findings.

Conclusion*:* In conclusion, this study has determined the baseline characteristics of the patients with postmenopausal osteoporosis particularly regarding risk factors and the 6th month results revealed a good safety and tolerability profile for raloxifene.

OP043

ASSESSMENT OF COMPLIANCE WITH RALOXIFENE IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS OR OSTEOPENIA: AN OBSERVATIONAL STUDY- EVOS (EVISTA OSTEOPOROSIS STUDY) /BASELINE CHARACTERISTICS

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On behalf of the EvOs Study Group

Objective: This study was designed as a multicenter, prospective and longitudinal observational study to assess primarily the compliance, secondarily the efficacy, safety and tolerability of raloxifene in a large group of postmenopausal women with osteoporosis/osteopenia in Turkey.

Methods: Postmenopausal women with high risk of osteoporotic fractures, who were assigned to receive raloxifene, were included into the study. Patients with intolerable vasomotor menopausal symptoms, or had a contraindication for raloxifene were excluded from the study. At the baseline evaluation, demographical data, medical history, drug use, and risk factors, physical examination and selected laboratory, DEXA, and radiological test results were recorded. After the baseline visit, patients will be evaluated at the 6^{th} and 12^{th} months of treatment for the follow-up examination.

Results: A total of 1615 patients from 33 clinics were included: mean age 57.8±7.4 (34-90), and menopause age 45.9±5.3 yrs. Osteoporosis was diagnosed 1.7±2.4 (0-23) years before the enrollment into the study. Patients' mean height was 157.5±6.2 cm at baseline, but was reported to be 159.5±5.6 cm at 30 yrs of age. Regarding risk factors for breast carcinoma, 6.3% had a history of fibrocystic breast disease, 5% had no history of pregnancy, 4.3% had an increased density at mammography, 4.4% had a family history of breast cancer and 2.7% had a history of previous biopsy of breast. Risk factors for osteoporosis were: early menopause (29.4%), age>65 (18.8%), slender build (17.4%), family fx history (8.4%), history of fx after age 40 (7.4%). Among all reported fractures, wrist fracture with a rate of 20.5% was the most common one, followed by vertebrae (14.4%), foot (13.3%), ankle (9.7%), arm (9.2), shoulder (8.7%), hip (3.1%) and others. Complaint of back pain was present in 53.8% of the patients. Of the patients with previous osteoporosis, 33.1% have been treated with calcium, 18.7% with alendronate, 17.5% with hormonal replacement therapy, 17.0% with vitamin D, 14.1% with calcitonin and 3.1% with risedronate. The reason for discontinuation of previous treatment was ineffectiveness of the treatment in 15.5%, noncompliance in 14.5%, adverse events in 9.5% and other reasons in 11.7%. The treatment has been changed because of gastrointestinal complications in 37.9% and vaginal bleeding in 8.5% of the cases. Hot flushes were reported in 44.8% of the patients and this complaint was mild in 75.8%, moderate in 18.5% and severe in 5.7% of these cases. The vital signs were within normal limits. Hypercholesterolemia was present in 37% of the patients.

Conclusion: In conclusion, baseline data from the EvOs study indicate a high prevalence of risk factors for osteoporotic fractures as well as risk factors for breast cancer and cardiovascular disease in a postmenopausal Turkish population receiving Raloxifene. The data which will be obtained at the follow-up visits will reveal the compliance, efficacy, safety and tolerability of Raloxifene on an observational basis.

OP044

IMPORTANCE OF PHYSICAL THERAPY IN THE TREATMENT CHILDREN WITH ATRHROGRYPOSIS MULTIPLEX CONGENITA

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Objectives*:* A special type of a physically handicapped child is the child with congenital arthrogryposis, which is classified as one of the most severe physical orthopedic physical diseases.AMC is a disease, characterized by non-progressive congenital multiple contractures of joints where connective tissue exchanges muscle tissue. The essential principle we stand for in the treatment of children with arthrogryposis is based on the initiation of treatment from the first day of life.

Methods: We studied a group of 46 children with arthrogryposis treated at the Institute for mother and child from 1994-2003. Treatment is conducted in two modes, which are closely interlinked, although a more long-term and significant role is played by physical therapy that becomes the part of everyday life in these patients.a) Conservative-physical treatment) Surgical-orthopedic treatment. In the treatment the following procedures are used: kinesiotherapy, thermotherapy, elektrotherapy, hydrotherapy, occupational therapy, corrective plaster cast splints and orthoses.

Results: Treatment outcome was favorable in 67,8% of children in whom management was initiated with early physical therapy. A lower rate of 60% with favorable outcome was confirmed in children in whom therapy was initiated at age 1,5 - 3,5 months and the lowest rate of 12,5 % at age 4 months to 3 years. By statistical analysis these differences in the distribution of findings were confirmed as significant ($p<0,001$); statistically significant correlation was also found between the age of children when the treatment was begun and outcome ($p<0,01$.

Conclusions: Thus, early diagnosis and early initiation of physical therapy represent an imperative in the treatment. Management of these children presents a complex, long-standing work, which requires application of multiple physical procedures, surgical techniques, extensive knowledge, patience and multidisciplinary cooperation (doctors, therapists, parents, psychologists, social workers). It is most significant to stress out that these children are of normal intelligence. All cases should be under follow-up until adult age, so that we could participate in all needs of the personality, education and mastering of skills necessary in everyday life.

OP045

IS HYALURONATE SODIUM EFFECTIVE IN MANAGEMENT OF OSTEOARTHRITIS? A PLACEBO-CONTROLLED DOUBLE-BLIND STUDY

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Objectives: In this study, we aimed to investigate the effect of intraarticular Hyaluronic acid(HA) injection on the parameters of pain, and function in knee osteoarthritis(OA).

Methods: Fourty-eight patients with knee osteoarthritis were included in this study. The patients were randomized into two groups; first group received HA with an average molecular weight of 1.5 million dalton, and second group received placebo containing 0.9% saline. Three injections were made to all patients; in the first, second and third weeks.Visual Analog Scale(VAS), Likert scale, Lequesne index, WOMAC(The Western Ontario and McMaster Universities Osteoarthritis index) scale for pain, stiffness, and function, and WOMAC pain subgroups such as pain with walking, with climbing stairs, at night, with sitting and lying down, with standing; the number of analgesics used, knee flexion angles, and patient satisfaction was evaluated. Evaluation of patients was made in the third, fifth, and twelveth weeks.

Results: Both HA and placebo groups showed significant improvement almost in all parameters($p<0.05$). There was no statistically significant difference between HA and placebo groups($p>0.05$)in all parameters, except for WOMAC's pain on walking being better in HA group($p<0.05$).

Conclusions: HA treatment is effective in the management of knee OA, but is not statistically different than placebo injection. Therefore patients who are candidate for receiving this treatment should be well determined, also for the cost-benefit effect.

OP046

EVALUATION OF THE UPPER EXTREMITY REHABILITATION OUTCOMES IN HEMIPLEGIC PATIENTS WITH OR WITHOUT COMPLEX REGIONAL PAIN SYNDROME

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Objectives: Complex Regional Pain Syndrome (CRPS) is an important problem that can affect hemiplegic patients' rehabilitation programme. Our aim in the study was to investigate the effect of CRPS to hemiplegic patients' upper extremity rehabilitation.

Methods: Eighty hemiplegic patients were admitted in the study. The patients were formed two groups as study and control groups. The study group were consisted of hemiplegic patients with CRPS and the control group were consisted of hemiplegic patients without CRPS. All patients were administered hemiplegia rehabilitation programme. Clinical evaluation was done by Upper-limb function, hand movements and advanced hand activities of the Modified Motor Assesment Scale and Ashworth scale before the rehabilitation and after the rehabilitation in two groups.

Results: While statistically significant difference of the MMAS Upper-limb function ($p<0.001$), hand movements and advanced hand activities($p<0.05$) in the control group, there was only statistically significant difference of the MMAS Upper-limb function in the study group($p<0.05$). There was no statistically significant difference of the Ashworth scale in both groups($p>0.05$). Comparison of results of two groups there was no statistically significant difference of the MMAS Upper-limb function, hand movements and advanced hand activities and Ashworth scale($p>0.05$).

Conclusions: Our study showed that CRPS can not affect the upper extremity rehabilitation outcomes in hemiplegic patients.

OP047

EVALUATION OF HYPOTHALAMIC-PITUITARY-GONADAL AND HYPOTHALAMIC-PITUITARY-ADRENAL AXES AND RELATION BETWEEN HORMONAL LEVELS AND CLINICAL SYMPTOMS IN FEMALES WITH FIBROMYALGIA

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Objectives: Fibromyalgia (FM) is a disorder characterised by pain in the muscles and soft tissues, severe fatigue and often associated with anxiety and depression. To date many hypothesis about its aetiology have been suggested, however none of them has been proved yet. We aimed to investigate abnormalities of hypothalamic-pituitary-gonadal (HPG) and hypothalamic-pituitary-adrenal (HPA)

axes and to evaluate relation between hormonal levels and clinical symptoms any effect on these hormones in females with FM.

Methods: We examined follicle stimulating hormone (FSH), luteinizing hormone (LH), estradiol, progesterone, prolactin, dehydroepiandrosterone sulphate (DHEAS), sex hormone binding globuline (SHBG) concentrations in 132 young females with FM and compared matched 81 healthy controls. All patients fulfilled the American College of Rheumatology criteria for FM. Depression rate was assessed by Beck Depression Inventory (BDI) and patients with high scores of BDI were compared to patients with low scores of BDI. Pain intensity was measured to visual analog scale and severity of clinical symptoms was measured to Likert scale.

Results: There were no significant differences in FSH, LH, estradiol, prolactin, and progesterone levels between FM patients and healthy controls while DHEAS (p=0.038) and SHBG (p=0.010) levels were significantly lower in patients compared to controls. There were significant correlation between serum DHEAS levels and duration of pain (r=-0.32, p=0.013), BDI score (r=-0.246, p=0.028); correlation between serum SHBG levels and fatigue (r=-0.315, p=0.004), and sleep disorder (r=-0.224, p=0.046) in FM patient group.

Conclusions: In conclusion, Any significant difference was not determined at serum FSH, LH, estradiol, progesterone, prolactin, levels between FM patients and the controls. Serum DHEAS and SHBG levels were significantly lower in FM patients compared to controls. There was statistically significant correlation between serum DHEAS, SHBG levels and some symptoms as duration of pain, fatigue, sleep disorders, BDI score. This study has pointed out that there would be neurohormonal disfunction in FM and this situation could effect the symptoms as pain, fatigue, sleep disorders and BDI score.

OP048

THE RELIABILITY OF KUKURTLU QUESTIONNAIRE DEVELOPED TO EVALUATE PATIENT SATISFACTION IN BALNEOTHERAPY AND PHYSICAL THERAPY APPLICATIONS

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Objectives: The purpose of this study was to determine the reliability of the Kükürtlü questionnaire that is used for the evaluation of the satisfaction of patients who participated in balneotherapy and/or physical therapy in Kükürtlü spa.

Methods: A total of 304 patients participating in half a day balneotherapy and physical therapy in Kükürtlü Thermal Spring during twelve months joined the study. They answered questions about health care staff behavior , cleanliness, benefit from the treatment and problems encountered during the thermo therapy and physical therapy.

Results: The coefficient for reliability (Cronbach alpha= .892) obtained for nine sub-headings after statistical analysis was clearly within a desired range.

Conclusions: The increased importance of measuring patient satisfaction raises reliable, valid questionnaire composed of easy to answer questions. Test developers typically strive for an instrument with a coefficient for reliability in the range of .80 to .90. The coefficient for reliability computed from our questionnaire exceeded that criterion. It was concluded that the Kükürtlü Questionnaire was highly reliable and easy to answer and could be used in thermal spring and physical therapy units to determine the patient satisfaction for different patient groups

OP049

EVALUATION OF THE PATIENTS WITH OBESITY AND FIBROMYALGIA SYNDROME

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Objectives: The aim of this study was to determine fibromyalgia syndrome (FS) frequency in obese subjects and to investigate the effect of fibromyalgia and chronic musculosceletal system symptoms on general health and psychological status.

Methods: Forthy-two obese women subjects (mean age 48,85±11,69 (min 24, max 65)) and 20 healthy women (mean age 47,65±7,76 (min 35, max 59)) were included in the study. The pain pressure threshold (PPT) of both groups were measured over 18 predetermined tender points using algometer. The number of tender points, total myalgic score (TMS) and control point score (CPS) were calculated. Functional difficulties of both groups were assessed by using Health Assessment Questionaire (HAQ) and psychological status was evaluated using Beck Depression Scale (BDS) in patients and control groups.

Results: Mean TMS of the obese subjects was 75,18±14,27 (min 48,5, max 107,5) and mean TMS of the control group was 135,08±14,36 (min 104,8, max 155,7). There were statistically difference between obese and control group for TMS ($p<0.001$). Mean PPT values of the obese subjects was 2,77±0,55 (min 1,73, max 4,49) and mean PPT values of the control group was 5,26±0,69 (min 4,29, max 6,99). There were statistically difference between obese and control group for PPT values ($p<0,001$). In obese group, the number of tender points was found higher than control group. Mean HAQ score of the obese group was 1,77±1,52 (min 0, max 7,69) and mean HAQ score of the control group was 0,14±0,36 (min 0, max 1,5). Mean BDS score of the obese group was 22,09±10,49 (min 4, max 47) and mean BDS score of the control group was 6,4±0,36 (min 0, max 38). Statistically significant differences were found between HAQ and BDS in obese and nonobese women ($p<0.001$).

Conclusions: Obese subjects had decreased PPT and increased chronic musculoskeletal and fibromyalgic symptoms. We thought that obesity may be a causative factor for FS.

OP050

COMBINATION THERAPY OF FLUORIDE AND LOW DOSE ESTROGEN IN POSTMENOPAUSAL WOMEN WITH OSTEOPENIA

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Objectives: To investigate the changes of BMD, biochemical bone markers and lipid profiles after combination therapy of Fluoride and low dose estrogen(0.3mg) in postmenopausal women with osteopenia.

Methods: We studied 70 women with postmenopausal osteopenia who visited Department of Physical & Rehabilitation Medicine, Kosin Medical Center from march 2002 to may 2003. Subjects were divided in two groups ; Group I(n=30), treated with Fluocalcic(monofluorophosphate 100mg + Calcium500mg), Calcium (500mg), and low dose estrogen, and Group II(n=40), treated wuth estrogen(0.625mg) and calcium(1000mg). BMD(L-spine and femur), biochemical markers(osteocalcin and deoxypyridinoline), and lipid profiles were measured at baseline and 1 year after treatment.

Results: 1) Average postmenopausal periods are 2.90yrs and 3.53yrs each other. 2) BMD increased significantly in two groups, and BMD in Group I increased significantly more than that in Group II. 3) Deoxypyridinoline decreased significantly in two groups, but osteocalcin significantly decreased in Group II. 4) Total cholesterol and LDL cholesterol decreased significantly in two groups, and no significant difference between two groups.

Conclusions: We concluded that combination therapy with Fluocalcic, calcium, and low dose estrogen(0.3mg) in postmenopausal women with osteopenia was more effective than combination therapy with estrogen(0.625mg) and calcium to prevent postmenopausal osteoporosis.

OP051

INFLUENCE OF TOTAL BREAST-FEEDING TIME ON BONE MINERAL DENSITY IN A TURKISH POPULATION

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Objectives: Despite numerous studies on risk factors for osteoporosis the effect of breast-feeding on bone mineral density (BMD) is unclear. In this study our aim was to determine the influence of total breast feeding time on BMD, and subsequent risk of osteoporosis.

Methods: Postmenopausal 1486 women over age 40 were included in the study. Women having diseases or under drug treatments known to affect bone metabolism were excluded. The BMD of lumbar spine and femoral neck were measured by dual-energy X-ray absorptiometry technique either by Norland XA-26 or Lunar DPX-IQ and transferred to standard values.

Results: One way ANOVA test showed a significant difference between lumbar spine and femoral neck BMD of women who had breast fed <24 months, between 24-60 months, and >60 months (p=0.000, p=0.000). Post hoc Bonferroni test revealed that both lumbar spine and femoral neck BMD were higher in women who had breast fed <24 months than women who had breast fed between 24-60 months, and both of these groups than women who had breast fed >60 months ($p<0.05$ for all double group combinations). In subsequent analysis other potential risk factors were also considered in a multiple linear stepwise regression model. Years since menopause (p=0.000), weight (p=0.000), total breast feeding time (p=0.000) and body mass index (p=0.002), were found to be the most important predictors for lumbar spine BMD; and age (p=0.000), weight (p=0.000), years since menopause (p=0.000), and total breast feeding time (p=0.001) for femoral neck BMD, respectively.

Conclusions: This study showed significant associations between total breast feeding time and BMD. Clinical guidelines and public health policies for prevention and intervention of postmenopausal osteoporosis should consider total breast feeding time as an important risk factor besides age, weight, and years since menopause.

OP052

EFFECTIVENESS OF FUNCTIONAL MAGNETIC VERSUS ELECTRICAL STIMULATION IN WOMEN WITH URINARY INCONTINENCE

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Objectives: Urinary incontinence is one of the most common medical complaints of women.We proposed to evaluate comparative study investigating the effects of functional electrical stimulation (FES) and functional magnetic stimulation (FMS).

Methods: We studied 22 female patients with urinary incontinence and evaluated in two treatment groups (14 patients in the FES and 8 in FMS group). The mean age of the patients in FES group was 51.14±11.9 and in FMS group was 42.25±6.9. Stimulation was applied continously at 30-50 Hz in FES group. The treatment sessions were for 20 minutes, twice a week for 6-8 weeks (12 with mixed, 2 with stress incontinence). FMS was applied by a "magnetic chair", twice weekly for 6 weeks (6 with mixed,1 with stress and 1 with urge incontinence). The efficacy of the treatment was judged from patient impressions, records in urinary diaries, results of 1 hour pad test, perineometry value and digital palpation score.

Results: The perineometry value, digital palpation score increased significantly during stimulation compared with prestimulation levels in both groups ($p>0.05$). For the pad test significant improvement was also noted in both groups ($p<0.05$) and in the urinary diaries there were significantly more cured or improved in FES group ($p<0.05$). However, there were no significant differences in objective outcome variables between FES and FMS treatment groups ($p>0.05$).

Conclusions: Both FES and FMS treatments were effective. FMS is free of complications, does not involve intravaginal stimulation. It can applied to the geriatric population who has prolapsus and infection. More research is required to evaluate which patients can benefit from conservative treatment and which criteria can predict the outcome of pelvic floor physiotherapy in women with urinary incontinence. This way, patients selection is possible and exessive costs can be saved.

OP053

PHYSICAL TRAINING OF PATIENTS WITH MYOCARDIAL INFARCTION

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Objectives: Physical training (PT) is the most effective method in the complex rehabilitation of patients with myocardial infarction (MI). Aim of the study was to examine the effects of physical training in patients with myocardial infarction by determining parameters of exercise test.

Methods: A group of 100 patients with MI without any complications in acute phase underwent posthospital rehabilitation at the institute for cardiovascular diseases "Niska Banja". Control group consisted of 40 patients with MI who did not have posthospital rehabilitation. After the clinical and laboratory examinations submaximal or symptom-limited exercise test on bicycle ergometer was performed in all the patients. PT was prescribed to all participants. Intensity of PT was recommended to be 70% of maximal hearth rate obtained at the submaximal or symptom - limited exercise test. PT was performed daily. It consisted of morning gymnastics, walking and bicycle ergometer training and lasted 17 – 31 days (average 19). At the end of PT exercise test was performed in all the patients.

Results: Physical training significantly increased the level of endurance in patients with organized rehabilitation from 61,3 ±10,2 Watts to 96,7± 13,4 Watts after PT ($p< 0,01$) and that increase was significantly higher compared with control group (79,4± 13,2 Watts) ($p <0,05$). The duration of physical endurance was significantly higher in patients with PT (11,1 ±1,8 minutes) than in control group (9,4 ±1,3 minutes) ($p< 0,05$). Physical training significantly increased the value of double product in physical stress in patients with organized rehabilitation (228,1± 21,4) compared with control group (176,1± 26,7) ($p< 0,05$).

Conclusions: In patients with myocardial infarction physical training significantly increased the level and duration of physical endurance and the value of double product.

OP054

INFLUENCE OF REGULAR EXERCISE ON ANXIETY IN POSTMENOPAUSAL WOMEN

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Objectives: Menopause is a state where quality of life may decrease. Sleep pattern disturbance, anxiety or depression, short term memory loss and somatic symptoms could be the result this decrease.Our aim was to test the effects of regular exercise on anxiety of postmenopausal women

Methods: 18 postmenopausal women participated in the study.The subjects performed exercise 3 times a week for 6 weeks. Exercise sessions consisted of 15-20 minutes of warm up, 25-30 minutes of abdominal and back muscle strengthening and 10 minutes of cool down. All subjects completed the state trait anxiety inventory at the beginning and end of exercise period.

Results: The mean of state and trait components were 46.76±7.8 and 52.65±6.68 at the beginning and 36.17±5.79 and 44.53±6.56 at the end. The change in the state and trait components of the inventory was statistically significant by Wilcoxon test.

Conclusions: These results document the potential utility of regular exercise in promoting psychologiical health in postmenopausal state

OP055

EFFECTIVENESS OF RESISTANCE VS. AEROBIC TRAINING IN OBESITY

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Objectives: The aim of this study is to compare the effects of Progressive Resistive Exercise (PRE) and aerobic exercises on body composition, muscle strength, endurance, blood pressure and depression in obesity.

Methods: Obese female patients admitted to Endocrinology and Metabolic Diseases Department and consulted by Physical Medicine and Rehabilitation Department for exercise were included into the study. Sixty obese women aged between 20-60 years old, and with Body Mass Index (BMI) of 30kg/m², or above, were randomized into 3 groups; 20 patients had aerobic exercises, 20 patients had progressive resistive exercise, and 20 were taken as a control group.In the group of aerobic exercises, 15 minutes rapid walking and then ergometer bicycle exercise were applied for 3 months. Patients made exercises in their optimized heart rates in first month, 3 days a week for 12-15 minutes; then in second month, 4 days a week for 20-30 minutes and then in third month 5 days a week for 30-45 minutes. In the group of PRE, strengthening exercises performed to the abdominal, pectorals, biceps, triceps, gluteal, hip abductorius and quadriceps muscle groups with Vectra 4800 stationary exercise unite. Patients were trained to lift 40-60% of the maximum weight that they could lift for 3 days a week. They did every exercise for 1 set consisted of 10 repetitions. In the second week, they did two sets, and third week they did 3 sets. In the fourth week, they used 75-80% of the maximum weight that they could lift for 3 sets. A rest were given for 15-30 seconds between sets. Flexibility exercises were given for muscle groups before and after exercise in both groups. Every stretching were made for 10-30 seconds for 3-5 times until they feel stretched. No exercise were given to the control group.

Results: There was no difference between groups before treatment in regarding to age, height, weight, BMI, waist and hip circumference, waist-hip ratio (WHR), VO2 max, walking test, abdominal muscle strength and endurance, back muscle strength and endurance, strengths of hip abductor, quadriceps, biceps, triceps, abdominal and pectorals muscles, repetitive sitting-standing numbers, repetitive squat numbers, FM, FFM, Beck Depression Scale, blood pressure ($p>0.05$). There was a statistically significant increase in abdominal and quadriceps muscle strength at the and of 3rd month in PRE group when compared with aerobic group ($p<0.05$). One repetition hip abductor muscle strength was significantly increased in 2nd month ($p<0.05$), and also in 3rd month much more ($p<0.01$) in the group of PRE. There was no statistically significant difference in weight, WHR, hip circumference, back muscle strength, diastolic blood pressures and Beck Depression Scale between the groups of PRE and control at the end of 3rd month ($p>0.05$) while; significant differences were found in other parameters in PRE group ($p<0.05$). There was no significant difference in weight, WHR, BMI, hip circumference, back muscle strength, diastolic and systolic blood pressures between the aerobic exercise and control groups at the end of 3rd month ($p>0.05$).While; significant differences found in other parameters in aerobic group ($p<0.05$).

Conclusions: We concluded, that both PRE and aerobic exercises in obese patients were useful for increasing the exercise and cardiovascular system capacity, muscle strength, endurance, FFM and decreasing FM. Especially on the lower extremity muscle strength (hip abductors and knee extansors) and abdominal muscle strength, PRE exercises were found much more significant when compared with aerobic exercise group. Moreover, PRE were found effective on systolic blood pressure while aerobic exercises were found effective on depression.

OP056

SWALLOWING DISORDERS IN CHILDREN WITH SPASTIC CEREBRAL PALSY: RESULTS OF INTERVENTION

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Objectives: Children with cerebral palsy may have swallowing disorders which may result in feeding problems, malnutrition and aspiration increasing the risk of morbidity and mortality. In this study our aim was to determine the 6 months results of intervention in spastic cerebral palsied children with clinical and/or radiographic evidence of dysphagia.

Methods: Thirty spastic cerebral palsied children with clinical and/or radiographic evidence of dysphagia were included in the study. Clinical examination which was scored by Rehabilitation Institude of Chicago (RIC) clinical dysphagia scale included history and physical examination. Intervention which may include positioning, oral sensorimotor therapy and oral motor exercises, modifying volume of food, changing food consistency, swallowing manuevers, speech therapy and special education was provided to all of the patients with convenient combinations to patients' requirements. Progress was evaluated by comparing the outcome of pre and post-intervention results of clinical evaluation.

Results: Baseline and post-intervention mean RIC clinical dysphagia scale was 44.57±0.71, and 46.47±0.75, respectively. Significant improvement was found in RIC clinical evaluation score after treatment (p=0.000). Number of patients who had coughing during feeding (p=0.002), mouth odor (p=0.000), history of pneumonia (p=0.046), and drooling (p=0.000) decreased significantly after intervention. Statistically significant improvements were obtained in biting (p=0.005) and chewing (p=0.001) functions; lip closure (p=0.000) and succing (p=0.000); posterior (p=0.005) and anterior elevation (p=0.005), lateralization (p=0.000) and rotation (p=0.000) of tongue; gag reflex (p=0.014) and voluntary coughing (p=0.025); and speech (p=0.003).

Conclusions*:* Spastic cerebral palsied children with clinical and/or radiographic evidence of dysphagia can benefit from therapeutic intervention with respect to patients' requirements.

OP057

VENTILATORY MUSCLE TRAINING AND AEROBIC EXERCISE PROGRAM IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Objectives: Although there have been important improvements for medical management of the diseases in recent decades, there are up growing evidences of need for supporting rehabilitation programs to chronic obstructive pulmonary disease (COPD) patients. The main aims of pulmonary rehabilitation are to improve life quality, strength and endurance; additionally prevent dyspnea as well. We aimed to investigate effectiveness of ventilatory muscle training and aerobic exercise program in chronic obstructive pulmonary disease on scores of St George's respiratory questionnaire (SGRQ).

Methods: Our study designed for this aim was conducted in 19 COPD patients. After completion of 6-8 weeks home-based threshold inspiratory muscle trainer program, hospital-based 3 weeks intensive bicycle ergo meter exercise training was conducted for each patient. The pulmonary function test, blood gas analysis, 6 minutes walk distance and SGRQ scores were assessed at baseline, after completion of ventilatory muscle training and finally at the end of the aerobic exercise training.

Results: There were statistically significant improvements in 6 minute walk distance and health related quality of life sub item scores of SGRQ ('symptom', 'activity', 'effect' and 'total score') ($p<0,05$). Consecutive functional and HRQL improvements were seen after both ventilator muscle exercises and aerobic exercise separated as pulmonary rehabilitation components.

Conclusion: These results confirm our thought that pulmonary rehabilitation could be separated confidently and additional benefits could be more powerful with preparing the respiratory system before aerobic exercise training.

OP058

AEROBIC EXERCISE CAPACITY AND DYNAMIC LUNG FUNCTIONS OF PATIENTS WITH RHEUMATOID ARTHRITIS: COMPARED TO NORMAL CONTROLS

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Objectives: Background: Rheumatoid arthritis (RA) is a chronic and systemic disease which affects the pulmonary functions and aerobic exercise capacity of the patients. The aim of this study is to evaluate dynamic pulmonary functions and aerobic exercise capacity (AEC) and to investigate the correlation between AEC and disease activity parameters in patients with RA.

Methods: Eighteen female patients with RA (49.2±8.4 years) and eleven age and sex matched healthy subjects (45.3±5.7 years) were included. Dynamic pulmonary functions were tested and forced vital capacity, forced expiratory volume in one second, FEV1/FVC, and maximal voluntary ventilation were measured. Ergospirometric exercise test on treadmill by using breath-by-breath analysis of oxygen consumption. Maximum hearth rate (HR), MET level, peak oxygen consumption (VO2peak), exercise duration were recorded. Pain intensity (visual analog scale), fatigue level (5 point likert scale), disease activity (DAS28), patient's and physician's global assessment, and CRP were assessed in patients with RA.

Results: Median fatigue level of the patients was 1. The mean disease duration, pain intensity, and DAS28 score were 10.8±7.3 years, 42.8±22.0, and 3.9±1.5, respectively. Disease activity levels of the patients were mild-moderate according to DAS28. Although dynamic pulmonary functions were decreased patients with RA, there was no statistically significant difference between two groups. The mean VEpeak, VO2kgAT, VO2peak, HR and MET level of RA patients were significantly lower than that of the control subjects. The other parameters did not differ between two groups. Exercise parameters did not correlate statistically with any of the disease activity parameters.

Conclusions: The patients with mild-moderate RA seem to have impaired pulmonary functions and low aerobic exercise capacity, but no correlation was found between the exercise capacity and disease activity for this group of patients. Since patients have decreased aerobic exercise capacity, aerobic exercise programs may be suggested to improve functionality and dynamic lung functions of patients with mild-moderate RA.

OP059

MUSCLE PERFORMANCE IN PATIENTS WITH FIBROMYALGIA

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Objectives: Fibromyalgia (FMS) is a syndrome expressed by chronic widespread body pain which leads to reduced physical function and frequent use of health care services. This study was performed to compare muscle performance, the measurements of lumbosacral and ferguson angles in women with FMS and in healthy women. Student's t-test was used for statistical analysis.

Methods: Fourty six women with FMS and 46 healthy women who were physically inactive underwent measurements of three parameters: abdominal muscles, lumbar muscles, and chest expansion.

Result: The strength of lumbar muscles and measurement of chest expansion were significantly decreased in the FMS patients as compared to the controls ($p<0.0001$).

However, the lower lumbar and abdominal muscles strength was found in both patients and controls.

Conclusion: Our results indicate that patients with FMS have impaired strength of lumbar and abdominal muscles and measurement of chest expansion. Strength training may have benefits on some FMS symptoms. Supervised aerobic exercise training may have beneficial effects on physical capacity and FMS symptoms.

OP060

THE AETIOPATHOGENETIC ROLE OF INTERLEUKIN-4, INTERLEUKIN-10 AND VCAM-I LEVELS IN FIBROMYALGIA PATIENTS

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Objectives*:* Fibromyalgia (FM) is a syndrome characterized by abnormal central sensory processing of pain signals and is thought to arise from a combination of interactions between neurotransmitters, external stressors, behavioral constructs, hormones and the sympathetic nervous system. Although cytokines are suspected to play a role in FM, their precise dynamics has escaped elucidation. IL-10 is known to have many different roles in the immune system; it can block pain, increase B cell levels, and decrease IL-6 and TNF-α production. IL-4 promotes adhesion of lymphocytes to endothelial cells, stimulating the expression of adhesion molecules, such as vascular cell adhesion molecule-1 (VCAM-1). This study was performed to assess the expression of IL-4, IL-10 and VCAM-1 in FM with respect to their importance in pathogenesis, and link with disease-related parameters.

Methods: 5,7±Twenty-five female patients with a mean age of 41,67 years who met the 1990 ACR criteria (ref) for the classification of FM, were examined and compared with 23 healthy, age and body mass index (BMI) matched 11,1 years). All subjects were interviewed and±female subjects (mean age 43,94 the existence of clinical features such as; fatigue, morning stiffness, sleep disturbance, headaches, joint or soft tissue swelling, Raynaud's phenomenon, irritable bowel syndrome, irritable bladder, interstitial cystitis, chest pain, dyspnoea, dry mouth, numbness were recorded. Tender points were examined using the protocol described by Wolfe et al (ref). The health status of patients was assessed by Fibromyalgia Impact Questionnaire (FIQ). IL-4, IL-10 and sVCAM-1 assays in sera are based on the quantitative "sandwich enzyme immunoassay" principle using two monoclonal antibodies. All samples were measured by commercial ELISA kits (Roche Diagnostic).

Results: VCAM levels were decreased in patients (809,28 ± 276,01) compared to controls (1000,26 ± 314,03) ($p< 0,03$). On the other hand we found that IL-10 levels were increased in patients with fibromyalgia (30,24) compared to controls (18,26)($p= 0,001$). We couldn't find any detectible biochemical alteration for IL-4 measurement in each group.

Conclusions: IL-10 increases B-cell levels, promotes energy by down-regulating type 1 responses and decreases IL-6 and TNF-production by monocytes and it can block pain. The increased level of IL-10 in our FM patients may be due to chronic widespread pain and the struggle to block pain in this syndrome. As a result, cytokine changes in FM don't seem to be the primary factor in pathogenesis of this disorder, however cytokine alterations may be observed secondary to other factors.

OP061

SEXUAL DYSFUNCTYON YN PATYENTS WYTH FYBROMYALGYA

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Objectives: To evaluate sexual function in patients with fibromyalgia.

Methods: For this purpose 35 married female patients fulfilling the ACR 1990 criteria for fibromyalgia and 20 married female healthy volunteers were enrolled in the study. Patients with gynecologic and systemic disorders which can cause sexual dysfunction such as hormonal, neurogenic and cardiovascular diseases were excluded from the study. Patients with major depression whom diagnosed by a psychiatrist according to SCID-I interview and Hamilton depression rate scale did not include in the study. Patients receiving anti-depressants drugs, hormone replacement therapy and other drugs which are known to interfere with sexual functions were also excluded from the study. Female Sexual Function Index (FSFI) was used to evaluated sexual function. A 6 domain structure was identified, which included desire, subjective arousal, lubrication, orgasm, satisfaction and pain with FSFI. The quality of life was assessed by the Fibromyalgia Impact Questionnaire (FIQ).

Results: The mean ages of the fibromyalgia group and control group were 42.2± 11.4 years and 39.1±10.9 years, respectively . The two groups were comparable with occupation, education, economic status. FIQ was founded to be significantly increased in patients with fibromyalgia compared to controls ($P<0.05$). In statistical analysis, FSFI total score was founded to be significantly decreased in patients with fibromyalgia compared to controls (22.5±7.2 and 27.4±7.5 respectively, $P=0.008$). All FSFI domain scores were also determined to be significantly decreased except pain domain in patients with fibromyalgia.

Conclusions: The results of the present study showed that female patients with fibromyalgia have sexual dysfunction compared to healthy controls.

OP062

COMPARISON OF THE RATE OF THE POSITIVITY AND NEGATIVITY OF THE SLUMP AND OF THE STRAIGHT LEG RAISING (SLR) TESTS IN PATIENTS WITH AND WITHOUT LUMBAR DISC HERNIATION.

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Objectives: To measure the sensitivity and the specificity of the Slump and of the Straight Leg Raising tests in patients with and without lumbar disc herniations in a retrospective case control study

Methods: Study group consisted of 68 patients seen at the outpatient clinic of İstanbul Hospital during 1998 and 1999. All the patients had been examined by the second author.

Control group consisted of 61 patients seen at the outpatient clinic of Red Crescent, Küçükçekmece Division, during 2001 and 2002. All the patients had been seen by the second author.

The inclusion criteria were the records of the patients with complaints of low back, leg, or low back and leg pain, who had results of magnetic resonance imaging(MRI) or computed tomography(CT), and also who had results of the Slump and SLR tests.

Results: We reviewed 2000 patient records at İstangul Hospital; Total numbar of patients with low back, leg, or low back and leg pain was 619. And we reviewed 8000 patient records at the Red Crescent outpatient clinic; Total numbar of patients with low back, leg, or low back and leg pain were 2602. The patients with recorded signs of hip and/or sacroiliac joint pain, and those who had not undertaken MRI or CT of the lumbar spine were excluded. The patients with MRI or CT findings showing herniations at L3-L4, L4-L5, and/or L5-S1 levels were included in the study group.

When all the patients were considered, the sensitivity of the Slump test was found to be 95.6% and its specificity to be 98.3%. The sensitivity of the SLR test was found to be 57.3%, and its specificity to be 95.1%. These results make the positive predictive values of the Slump and the SLR 98% and 92% respectively. The negative predictive values of the Slump and the SLR tests will be 96% and 69% respectively.

Among the patients with bulging discs the sensitivity of the Slump test was 90% and its specificity was 98.3%. The sensitivity of the SLR test, in contrast, was 50% and its specificity was 95.1%.

Among th epatients with protruded discs, the sensitivity of the Slump was 95.3% and its specificity was 98.3%. The sensitivity of the SLR test, in contrast, was 48.8% and its specificity was 95.1%.

Among the patients with extruded discs, the sensitivity of the Slump test was 100% and its specificity was 98.3%. The sensitivity of the SLR test, in contrast, was 92.3% and its specificity was 95%.

Conclusions: The Slump test applies more traction to the neuromeningeal tissues and thus is a more sensitive and a more specific test. The smaller the herniation the more sensitive is the Slump test. The Slump test has a higher specificity level comparing to the SLR test. But when positive and negative predictive values are considered the Slump test appears to have higher values. The SLR test has high sensitivity level only in discs that may ultimately require surgery.

In contrary to the common practice, the Slump test may be used as the primary test in the diagnosis and differential diagnosis of lumbar disc herniation.

OP063

CAUDAL EPIDURAL INJECTION IN THE TREATMENT OF THE LUMBAR RADICULAR PAIN:

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Objectives: Low back pain is common, and causes much morbidity and economic loss in the community. Within the past decade, a definite trend toward non-surgical management of lumbosacral disc herniations with radicular symptoms has occurred with recent researches. The evaluation and treatment options are considerable and yet outcomes associated with many treatments are either questionable or not well investigated. In this respect, the use of caudal epidural injections in the management of the low back pain and radicular pain continues to be commonplace. The goal of our study was to evaluate the effectiveness of caudal epidural blockade on patients with Lumbar Radicular Pain.

Methods: 30 patients (11 women, 19 men) between 22 and 45 years old (mean age 33 ± 6.6) were included in this study. They are diagnosed with physical examination, laboratory and radiological (CT and/or MRI). The caudal epidural injection was applied by the same doctor and under the same conditions. The injection material volume was 20 ml and contains 40 mg methylprednisolone acetate, 4 mg dexamethasone, 8 ml %2 prilocaine HCl and 10 ml %0.9 NaCl. No additional treatment was allowed. Follow-up assessments were made at 15th day, 1st and 3rd month after the injection. Visual analogue scale (VAS) and straight leg raise (SLR) assessments of pain and Back depression scale, Oswestry scale were used at the assessment of the patients.

Results: Statistically significant improvement in VAS and SLR has been shown at all times ($p<0.01$) comparing before the therapy. Oswestry scale results were also Statistically Significant ($p<0.05$) and the time pass Back depression scale results were improved.

Conclusions: Caudal epidural blockage for lumbar radicular pain can be an effective treatment modality but experienced person must apply it with great attention.

OP064

COMPARISON OF THE EFFECTS OF BOTULINUM TOXIN INJECTION, DRY NEEDLING AND PHYSICAL MODALITIES ON THE EMG ACTIVITY OF TRIGGER POINTS AND CLINICAL VARIABLES IN MYOFASCIAL PAIN SYNDROME

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Objectives: To evaluate te effects of botulinium toxin-A (BTX-A) injection, dry needling and physical modalities in the treatment of myofascial pain syndrome (MFPS).

Methods: 45 patients (41 women, 4 men), having trigger points in the upper trapezius muscle diagnosed as MFPS were included in this randomized, single blind, comparative study. Patients were randomized into three treatment groups namely dry needling (DNG), BTX-A injection group (BTX-A G) and physical modality group (PG). Each group consisted of 15 patients. All the patients were asked to do stretching exercises at home. Treatment efficacy was evaluated clinically before and 1 and 3 months after treatment. Electrical activity of the trigger points was measured before and 1 month after treatment. Evaluated parameters were pain at rest and during function VAS (VAS-R VAS-F), verbal pain score (VERB-PS), pain with trigger point pressure (TPP), number of the trigger points (NTP), palpable muscle spasm (PMS), general well-being by short form 36 (SF-36) and Beck Depression Inventory (BDI).

Results: Statistically significant improvements were observed in VAS-R VAS-F, VERB-PS, number of trigger points, muscle spasm, BDI and electrical activity of the trigger points in all three treatment groups. Improvement in VAS at 3 months was more significant in the BTX-A group. Pressure threshold of the trigger points in the DNG elevated and electrical activity in the 3 month after treatment. Significant correlations were also observed between pain by pressure and EMG activity in BTX-A and PG.

Conclusions: In this study we observed that trigger points in MFPS have spontaneous electrical activities. BTX-A injections, dry needling and application of physical modalities are the beneficial treatment choices in this disorder. We suggest that dry needling should be the preferred treatment method when cost effectvity is considered.

OP065

MERALGIA PARESTHETICA IS RELATED TO LOW-BACK PAIN

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Objective: Meralgia paresthtetica, a syndrome of pain and /or dysesthesia in the anterolateral thigh, is normally caused by an entrapment of the lateral femoral cutaneous nerve (LFCN) at the anterior superior iliac spine. The aim of this report is to emphasize that meralgia paresthetica can be confused with low-back pain. In few cases meralgia paresthetica can be confused with low-back pain.has been reported.

Methods: After approval by the Faculty Ethics Committee and written informed consent, 40 patients who have low-back pain included in the study. Patients were divided into either meralgia paresthetica (MP) or non-meralgia paresthetica (non-MP) according to the results of electromyography (EMG). All Patients in the MP group were assessed with magnetic resonance (MRI). The relationship between low-back pain and meralgia paresthetica was investigated according to the results of MRI.

Results: The relationship between low-back pain and meralgia paresthetica was investigated in 19 women (47.5%) and 21 men (52.5%) patients, the mean age of patients was 55.37±12.55 (range 27-75). No relationship was found meralgia paresthetica and low-back pain symptoms. The results of the MRI were not statistically different between the MP and non-MP groups ($p>0.05$).

Conclusion: MP can mimic low back pain because of similarity of the symptoms. It can be treated by conservative or ablative therapeutic interventions;however, conservative methods should be considered primarily.

OP066

ULTRASOUND AND LASER THERAPY IN THE TREATMENT OF CARPAL TUNNEL SYNDROME

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Objectives: This study was designed to compare the efficacy of ultrasound and laser treatment for mild to moderate idiopathic carpal tunnel syndrome (CTS).

Methods: Ninety hands in 50 consecutive patients with CTS confirmed by electromyography participated randomly in two experimental groups, ultrasound therapy and low level laser therapy (LLLT). Intervention in each group includes 15 daily treatment sessions (5 sessions/week). Ultrasound treatment (1 MHz, 1.0 W/cm^2, pulse 1:4, 15 min/session) applied to the area over the carpal tunnel of one wrist and LLLT (9 joules, 830 NM infrared laser at five points) applied to other wrist. Measurements were performed before and after treatment and also after 4 weeks follow up and include pain assessment by visual analogue scale; electroneugraphic measurement (motor and sensory latency, motor and sensory action potential amplitude), pinch and grip strength.

Results: By considering mean differences (MD) between groups and 95% CI, improvement was significantly more pronounced in the ultrasound group than in LLLT group for variables; motor latency with -0.76 MD (-0.96 to –0.56, 95% CI) and motor action potential amplitude with 1.99 MD (0.94 to 3.06, 95% CI), finger pinch strength with 6.66 MD (4.99 to 8.23, 95% CI) and pain relief with -3.14 MD (-3.72 to -2.55, 95% CI), with sustained effects after follow up period.

Conclusion: Results indicate both ultrasound and laser were effective, but ultrasound was better than laser. Further study is needed to investigate the combination therapy effects of these treatments in CTS patients.

OP067

EFFICACY OF LOW INTENSITY LASER TREATMENT IN CALCANEAL ENTHESOPHYTOSIS

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Objectives: To assess the effectiveness of low-intensity laser therapy in the treatment of epin calcanei

Methods: Seventeen patients (22 feet) with epin calcanei diagnosed with radiologic examination and having pain at least for more than one month were included in the study. Patients with inflammatory rheumatic disease and calcaneal bursitis, having neurologic deficit, with excessive pronation and pes cavus, with plantar nerve entrapment, and patients given physical therapy, corticosteroid injection and patients using regular non steroid anti-inflammatory drugs were excluded from the study. Gallium aluminum arsenide (GaAlAs) infrared diode device(30mW, 830 nm) was used for laser treatment and 1J/session was applied over to origin of the plantar fascia on the calcaneus and 2J/session were applied along the medial border of plantar fascia for five times a week for 3 weeks. Assessments were done before treatment, at the end of treatment and at the 1 month follow-up period. Evaluation consisted pain on first steps in the morning, pain of after activity, resting pain and effect of pain on daily life activities with VAS, walking ability period without pain (min), pain on palpation measured with heel tenderness index, toe walking pain with VAS.

Results: Mean age of the patients was 48.8+10.04 and symptom duration was 22.9+26.2(month). Pain on first steps in the morning, pain of after activity, resting pain and effect of pain on daily life activities which were all assessed by VAS score and heel tenderness index score were both found to be significantly decreased at the end of the study and this improvement persisted during the follow-up period ($p<0.05$). Walking ability period without pain was also found to be significantly increased ($p<0.05$).

Conclusions: Our results showed that low-intensity laser therapy was effective in the treatment of epin calcanei.

OP068

THE VALUE OF ULTRASONOGRAPHY IN THE DIAGNOSIS OF CARPAL TUNNEL SYNDROME AND TO COMPARE WITH ELECTRONEUROMYOGRAPHY

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Objectives: In this study our aim was to evaluate the carpal tunnel by ultrasonography in patients who had clinical findings and symptoms of the carpal tunnel syndrome and in healthy volunteers. We also aimed to evaluate the relationships between ultrasonographic and electrophysiologic parameters and the differences between diagnostic sensitivities of both techniques.

Methods: Our study group consisted of 54 patients with signs and symptoms of carpal tunnel syndrome (patient group) and 25 healthy volunteers (control group). After obtaining written informed consent, electroneuromyographic and ultrasonographic evaluation was

performed. In addition subjects in patient group were assessed by "symptom severity scale" and "functional status scale".
Results: There was no significant relationship between the duration of the symptoms and the ultrasonographic and electrophysiologic parameters. At least one of the electrophysiologic parameters was out of normal range in 80 of the 100 symptomatic wrists. According to upper limits cross sectional area of the median nerve was above normal in 19 % of the patients at radioulnar level, in 33 % of the patients at pisiform level and in 18 % of the patients at the hamatum level. The bowing of the flexor retinaculum was abnormal in only 6 of the patients. With a few exceptions there was no significant association between electrophysiologic and ultrasonographic parameters. The diagnostic sensitivities of electrophysiological parameters were significantly higher than those of ultrasonographic parameters. The Cohen cappa coefficients were low demonstrating a weak agreement between two diagnostic methods.
Conclusions: The results of this study showed that the sensitivity of the ultrasonographic parameters for the diagnosis of carpal tunnel syndrome is lower than the electrophysiologic parameters.

OP069
ABSOLUTE AND RELATIVE REFRACTORY PERIODS IN PATIENTS WITH CARPAL TUNNEL SYNDROME
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Objectives: Conduction of action potentials in neural system by sensory and motor fibers, provide possibility of connection between different organs.
In electrophysiological assessments of this system, attention to specific aspects will be useful for diagnosis. The purpose of this study is to evaluate the one of important physiologic principles of nerves, in patients with carpal tunnel syndrome (CTS).
Methods*:* Twenty-five patients with CTS participated in this study. Motor and sensory fibers of right and left median nerves stimulated with paired stimulation technique. Compound muscle action potential of abductor policies muscle and sensory nerve action potential of index finger recorded and refractory periods of above fibers measured in mild and moderate CTS.
Results: Patients with mild and moderate CTS in comparison to normal range indicated increase of absolute and refractory periods of median nerves. There are no significant differences in absolute and relative refractory period of motor fibers between mild and moderate CTS, but in sensory fiber differences of refractory periods (absolute and relative) between mild and moderate CTS were significantly ($P<0.05$). Comparison of refractory periods between right and left hand in above patients indicate no significant difference between them, but difference between sides with sever signs of CTS and other side just in sensory fibers indicate significant differences in absolute refractory period ($P<0.05$).
The results of this study determinate diagnostic value of sensory absolute refractory period, in primary stage of compression neuropathy such as CTS. In demyelination neuropathies sensory relative refractory period can be useful for assessment.

OP070
COMPLEX REGIONAL PAIN SYNDROME TYPE-I AFTER RUBELLA VACCINE
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Objectives: Complex regional pain syndrome type I (CRPS-I) is a complex disorder characterised by pain, autonomic dysfunction, and decreased range of motion. We reported a young girl with CRPS-I due to rubella vaccine.
The quality of the pain, objective findings on skin examination, and triple phase bone scan findings were consistent with the diagnosis of CRPS-I. She was ungergone physical therapy and psychotherapy. Improvement was observed with this therapy within 4 weeks.
Conclusions: CRPS-I after vaccination has been rarely reported. This case report may therefore be of interest.

OP071
CONSIDER THE EFFICACY OF DYNAMIC STABILIZATION EXERCISE ON LUMBOPELVIC GEOMETRY IN CLBP
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Objectives: The aim of this study was to determine the efficacy of lumbar stabilization exercise on lumbar lordosis angle and pelvic inclination angle
Methods: 10 patient (mean age 32+/-6 with chronic mechanical low back pain with at least12 months positive history of LBP invited to participate to this study . lumbar lordosis angle (LLA)and pelvic inclination angle(PIA)was measured with Flexible ruler and pelvic inclinometer respectively before And after treatment. stabilization exercise had done for 12weeks in two sets of 6weeks .first 6week every day and secound 6week every other day (3 days in week)repeatability of all data was tested.
Results: Data showed meaningful change of LLA and PIA after Sixth week of exercise ($P<0.05$).changes of parameters during sixth to twelfth week was constant($P>0.05$).follow up had done after one month all data measurement of all data Repeated data showed no meaningful differences with before treatment ($P>0.05$)
Conclusions: Stabilization exercise could be modify lumbar lordosis angle (LLA)and pelvic inclination angle(PIA) temporarily. some factor such as genetic , skeletal type and arrangement .height of disk and structure if ligaments and muscle s affect to lumbopelvic geometry. Stabilization exercise could be enhance motor unit requirement and muscular activity during course of treatment. in addition antagonistic coordination and muscular activity timing enhancement thus modify (LLA)and (PIA) temporarily.

OP072
ACUTE MYOPATHY IN A PATIENT WITH CONCOMITANT USE OF PRAVASTATIN AND COLCHICINE
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Objectives: Statins and colchicine are known to cause myopathy. Concurrent use of these therapies increases the risk of myopathy as they are both metabolized by the cytochrome P450 (CYP3A4) system. Herein we present a patient who had myopathy after concomitant use of colchicine and pravastatin which is metabolized outside the CYP3A4 system.
Methods: A 65-year-old woman with a history of chronic congestive cardiac failure, and ischemic heart disease admitted to the Physical Medicine and Rehabilitation department with an acute gout attack. She had been taking pravastatin for six years. Other

medications were losartan, spironolactone, furosemide and acetylsalicylic acid. On her admission erythrocyte sedimentation rate (ESR) was 80mm/h (normal: 0-20) and C- reactive protein (CRP) was 107mg/L (normal: 0-5). Renal function tests, serum electrolytes, liver function tests and urinalysis were normal. Colchicine was added to her treatment with a dose of 1.5 mg/day. An excellent response to colchicine was observed with the resolution of arthritis during the next few days but 20 days after colchicine therapy, symmetrical proximal muscle weakness developed. Laboratory results revealed creatinine phosphokinase 914 U/L (normal: 35-195), aspartate aminotransferase (AST) 149 U/L (normal: 8-46), alanine aminotransferase (ALT) 120 U/L (normal: 7-46). Co-administration of colchicine with pravastatin was thought as the etiology of the myopathy. After discontinuation of colchicine and pravastatin the patient's weakness improved and enzyme levels returned to normal.

Conclusions: Although pravastatin is not primarily metabolized by the CYP system and less likely interact with colchicine, myopathy developed in our patient. In conclusion we should be aware that neuromuscular toxicity can occur in the combined use of colchicine and pravastatin.

OP073

THE CORRELATION BETWEEN CLINICAL, ELECTRONEUROGRAPHIC, AND MAGNETIC RESONANCE IMAGING FINDINGS IN THE PATİENTS WITH CARPAL TUNNEL SYNDROME

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Objectives: Carpal tunnel syndrome (CTS) is a common entrapment neuropathy of the median nerve where it passes through the carpal tunnel. Although CTS is diagnosed primarily with clinical findings and electrodiagnostic tests, magnetic resonance imaging (MRI) can be helpful in confirming the diagnosis. In this study we aimed to investigate the correlation between clinical, electroneurographic (ENG) and MRI findings in patients with CTS.

Methods*:* A total of 30 hands with electrodiagnostically confirmed CTS (all female, mean age 47.63±5.93 years) were included in the study. The control group consisted of 30 hands of age and sex matched volunteers (all female, mean age 44.10±7.86 years) with a negative history of neuropathy and symptoms. The mean duration of the symptoms was 14.36±14.11 months. The patients were divided into 2 groups (mild, severe) according to the severity of the disease, electrodiagnostic findings and MRI findings. Increase in signal intensity and volume of median nerve, flexor tenosynovitis and flexor tendinitis were searched by MRI. The correlations between clinical, electrodiagnostic and MRI findings were evaluated.

Results: No statistically significant difference was found between clinical and ENG findings ($p>0.05$) and between ENG and MRI findings ($p>0.05$). Increased signal of the median nerve was seen in 14 of 30 wrists ($p>0.05$), increased volume of the median nerve was seen in 18 of 30 wrists ($p>0.05$), increased flexor tenosynovitis was seen in 11 of 30 wrists ($p>0.05$), increased flexor tendinitis was seen in 25 of 30 wrists ($p<0.05$). The only statistically significant difference found between patients with CTS and asymptomatic subjects was flexor tendinitis.

Conclusions: Although MRI findings are not sufficiently sensitive or specific to establish the diagnosis of CTS, MRI can help to determine the etiology and make treatment decisions and also can be used as a follow-up method.

OP074

THE PULMONARY INVOLVEMENT IN LIFE-LONG NON-SMOKING AND RESPIRATORY ASYMPTOMATIC PATIENTS WITH RHEUMATOID ARTHRITIS AND ANKYLOSING SPONDYLITIS

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Objectives: Pulmonary involvement seen in rheumatoid arthritis (RA) and ankylosing spondylitis (AS) has been detected increasingly by using high sensitive diagnostic techniques such as high resolution-computed tomography (HRCT). However, HRCT findings in healthy controls and the effects of smoking and drugs have not been well studied.

Methods: The aim of this controlled study was to evaluate the relationships between disease specific clinical, laboratory, HRCT and PFT findings in respiratory asymptomatic and non-smoker methotrexate (MTX) used 20 patients with RA, and sulphasalazine used 20 patients with AS.

Results: For this purpose, totally sixty persons (40 patients and 20 healthy controls) were included in this study. Restrictive pattern on pulmonary function test (PFT) was detected in 4 patients (20%) with AS, 1 patient with RA and 1 control ($p<0.05$). Fourteen patients (70%) with RA and 10 patients (50%) with AS had positive HRCT findings. Only one patient (5%) in control group had abnormal HRCT ($p<0.05$). Interstitial lung disease (ILD) was the mostly seen HRCT findings in both RA (35%) and AS (20%) groups. The chest expansion measurement, the score of VAS for pain, and CRP levels were statistically significantly better in patients with AS having normal HRCT than those of abnormal ($p<0.05$). It was not detected any correlation between HRCT and duration of disease, disease activity markers, functional indexes, and PFT in patients with RA and AS.

Conclusions: HRCT is a sensitive tool in detecting ILD in patients with RA and AS with no signs and symptoms of pulmonary involvement and should be an integral part of such workup. Baseline lung HRCT should be obtained before DMARDs, mainly MTX treatment to differentiate pulmonary involvement of RA and pulmonary toxicity of DMARDs.

OP075

EFFICACY OF A NEW TRACTION TECHNIQUE IN PRONE POSITION ON DISTRACTOIN OF LUMBAR VERTEBRAE IN CHRONIC LOW BACK PAIN: A RANDOMIZED PLACEBO CONTROLLED TRIAL

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Objectives: In medicine, traction is used for act pulling force to producing distraction or seperation between two or more parts of body. However, it is limited to the cervical or lumbar spine in physiotherapic application. We aimed to investigate efficacy of new lumbar traction technique on intervertebral spaces and other anatomic structures of lumbar vertebral region.

Methods: Sixty two consecutive patients (37 men and 25 women) with persistent low back pain resulting from lumbar disc bulging,

disc degeneration, segmental instability and other mechanical causes participated in this study. We conducted randomised controlled trial with new traction equipment which investigated efficacy of high-dose and low dose (sham) traction in chronic low back pain. A specially designed equipment was used to apply traction in prone position. High dose traction was applied to 31 of patients and low dose to 31 of them. Lumbosacral radiographs were obtianed before and during traction to determine changes in the L1-L2, L2-L3, L3-L4, L4-L5 and L5-S1 disc spaces; sacral inclination and lumbar lordosis angles and L1-S1 total distances.

Results: We detected significant distraction in each disc space; decreasing in both angles and increasing in L1-S1 total distance with high dose traction. There weren't significant changes in these parameters with sham traction.

In conclusion, this is a preliminary study to investigate efficacy of new traction technique in prone position. We detected significant changes in lumbar intervertebral disc spaces and other anatomic structures. Concomitant heating therapy with traction may be possible in prone position. Moreover, gravitational force on disc material may contribute to creation of negative intradiscal pressure to suck back herniated disc material with distraction of lumbar vertebrae in this position. It should be carried out other studies to investigate efficacy of this traction equipment in treatment of low back pain.

OP076

THE EFFECT OF GABAPENTIN ON NEUROPATHIC PAIN

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Objectives: The goals of this article were to rewiev data on the efficacy and tolerability of gabapentin (a novel anticonvulsant) in the treatment of neuropathic pain in adults and to determine the optimal dosing schedule

Methods: Fourty patients (34 females,6 males) with neuropathic pain were recruited for the study.Subjects included 15 patients with radiculopathy,10 patients with carpal tunnel syndrom,6 patients with diabetic neuropathy,3 patients with femoral neuropathy,2 patients with posttramatic neuropathy. In this report the effective dose of gabapentin for pain relief ranged from 300 mg to 2400 mg daily. NSAİD's and paracetamol were permitted throughout the study. Pain intensity was assessed at the time of inclusion and at the first,second, fourth and eighth weeks with LANSS (The Leeds Assessment of Neuropathic Symptoms and Signs)pain scala and with VAS (visual analog scala). Quality of life was evaluated with SF 36 (short form 36)

Results: The primary effect variable ,change in average daily pain score from baseline to the final week,showed significant differences.($p<0,05$)At each weekly assessment,all four symptoms(allodynia,burning pain,shooting pain and hyperalgesia) improved with gabapentin.There were significant differences in burning pain and hyperalgesia.($p<0,05$) All parameters of the LANSS scala improved during treatment . ($p<0.05$) All parameters of the SF 36 form improved during treatment.($p<0.05$) Gabapentin was well tolerated and all the patients completed the study.The most common adverse effects were mild to moderate dizziness and somnolence. Most of which were transient.

Conclusions: This study shows that gabapentin reduced pain and improves some quality of life measures in patients with a wide range of neuropathic pain syndrome.

OP077

COMPARISON OF THREE DIFFERENT APPROACHES IN THE TREATMENT OF CHRONIC LOW BACK PAIN: A RANDOMIZED CLINICAL TRIAL

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Objectives: Chronic low back pain is one of the most common disorders leading to disability and has negative effects on psychological state. Various therapeutic approaches have been proposed for patients with chronic low back pain and contradictory results have been reported about the effectiveness of the treatments. The aim of this study is to compare the effects of three therapeutic approaches in chronic low back pain in terms of pain, disability and depression.

Methods: 60 patients (mean age 40.2 years) with chronic low back pain (mean disease duration 39.8 months) were randomized to the three groups: I- aerobic + home exercise, II- physiotherapy (hot pack, ultrasound, TENS) + home exercise, III- only home exercise. Primary outcome measures were Roland Morris Questionnaire (RMQ), General Health Questionnaire (GHQ) and Beck Depression Inventory (BDI), and VAS pain. Secondary outcome measures were mobility measurements, peak oxygen consumption (VO2peak), exercise test duration, MET levels. All assessments were performed pre-post intervention and at one month follow-up.

Results: All the groups showed similar decrease in pain on the third assessment and there was no significant difference between the groups. In the first group there was a significant improvement in GHQ scores ($p<0,05$) and the second group showed a significant improvement in GHQ scores ($p<0,01$) as well as BDI scores ($p<0,05$) after treatment. The second group also showed significant improvement in RMQ at one month follow-up ($p<0,01$). There were similar improvements in exercise test duration and MET levels in all of the groups, on the contrary, VO2peak values and lumbar flexibility measurements did not differ in three groups.

Conclusions: All of the three therapeutic approaches were found to be effective in diminishing pain in patients with chronic low back pain, but physiotherapy was found to be more effective in improving disability and psychological status.

OP078

THE REHABILITATION OF PATIENTS WITH SPINAL CORD DAMAGE DUE TO UNCERTAIN ETIOLOGY: THE "C.P" PHENOMENON : CONFUSION AND PERPLEXITY

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We describe ten patients who were hospitalized for medical rehabilitation after sustaining spinal cord damage due to uncertain or unknown etiology.

This uncertainty caused sometimes partial co-operation of the patients and their families with the multi-disciplinary team. Confusion of the stuff who cannot predict any definite prognosis, uncertainty concerning taking further diagnostic procedures and finally, the dilemmas concerning what kind of clinical recommendations we should give.

OP079

ENDOCRINE PROFILES OF SPINAL CORD INJURED MALE PATIENTS

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Objectives: To evaluate endocrine profiles in men with traumatic spinal cord injry (SCI) more than 6 months before the study and to compare the differences between age matched healthy controls.
Methods: The steady state profiles of 27 men with traumatic SCI (mean age 31,2±7,3) and 22 age- matched healthy male volunteers (mean age 30,9±8,5) served as controls. Serum levels of FSH, LH, PRL, DHEA-S, total and free testesterone, ostradiol, T3, T4, and TSH were determined. Patients who have pressures sores, pneumonia, renal failure, epididymitis, febrile disease and a history of brain injury, respiratory failure, psychiatric and endocrine disorder were excluded from the study to identify the instable medical conditions.
Results: Our results showed that mean concentrations of LH, FSH, PRL, ostradiol, T3 and T4 were higher and DSEA-S, total and free testesterone and TSH were lower in the patients group. Statistically difference was found in plasma PRL, total and free testesterone and TSH levels between groups (p<0,001). Besides, it was found that all subjects had normal thyroxine (T4) hormone, five cases (18,5%) had low serum thyrotopin (TSH) and ten cases (37%) had low serum free testesterone. On the other hand, 18 cases (66,7%) had hyperprolactinemia.
Conclusion: In conclusion, the endocrine profiles of men with spinal cord injury were different from normal men. This study presents different patterns of thyrotopin, gonadotropin and testesteron changes in SCI subjects.

OP080

THE RELIABILITY OF PLETHYSMOGRAPHIC MEASUREMENTS IN THE ASSESSMENT OF ERECTION AFTER INTRACAVERNOSAL INJECTIONS IN PATIENTS WITH SPINAL CORD INJURY

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Objectives*:* The aim of this study was to determine the correlation between penile doppler ultrasonography and penile plethysmography in spinal cord injured patients who treated with intracavernosal papaverine injections for erectile dysfunction.
Methods: Fifteen chronic (time since injury > 6months) spinal cord injured patients were recruited in this study after their informed consents were obtained. The routine biochemistry values were in normal range in all patients. The levels of sex hormones were obtained in all patients before the study. Intracavernosal papaverine injections under sterile conditions were performed in all patients to adjust the dose adequate for 2-hour erection once a week for 3 weeks. Erections were assessed according to Schramek scale. Patients were assessed with doppler ultrasonography and penile plethysmography after full erection obtained. In doppler ultrasonographic assessment, end-diastolic arterial flow and systolic arterial flow were recorded, while maximum amplitude were recorded in plethysmography.
Results: Adequate erections obtained after 3 injections in 13 patients. In 2 patients, 4th injections were needed. After papaverine injections, Schramek grades of erections were 5 in all patients. Two complications were seen during the rehabilitation program; priapism in 1 patient and prolonged erection in 1 patient. It was found that mean systolic arterial flow rate was 78.5±29.5 cm/second, while end-diastolic flow rate was 11.9±6.1 cm/second in doppler ultrasound. On the other hand, mean maximum amplitude was 0.38±0.13 in plethysmography. There was a moderate correlation between plethysmographic values and systolic flow rate (p=0,02), and diastolic flow rate (p=0,03). Systolic and diastolic flow rate values were strongly correlated.
Conclusions: In conclusion, penile plethysmography seems to be an alternative method to doppler ultrasonography with its low cost and easy-to-use technique in the assessment of erectile dysfunction during diagnosis and follow-up.

OP081

DEPRESSION AND ANXIETY IN SPINAL CORD INJURED PATIENTS DURING THE REHABILITATION PHASE

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Objectives: This sudy was designed to evaluate the extent of spinal cord injury (SCI) patients depression and anxiety over the first year during the rehabilitation phase and identify the contributing factors.
Methods: A total of 40 (29 male and 11 female, mean age: 31,5+10 years) consecutive SCI patients were included in the study. Only those patients who were at least three months post injury and were asked to participate in the study voluntarily. Demographic data and functional outcome measurements were recorded during the rehabilitation phase.A comprehensive battery of instruments was used to asses the psychosocial morbidity by the same psychologist. Beck Depression Inventory (BDI), Beck Hopelessness Scale (BHS) and The Spielberg State-Trait Anxiety Inventory (STAI) were applied to screen depression and anxiety.
Results: Of the study group 15 patients (37,5%) were found to be depressed and 30 patients (75%) were found to be anxious at the beginning of the rehabilitation phase. BDI, BHS and STAI scores demonstrated a significant pattern whereby scores of depression and anxiety showed a significant decrease at the end of the rehabilitation period. Highly significant positive correlations were found between mean depresion and anxiety scores. Negative correlations were found between these scores and ASIA grades and functional independent measurements.
Conclusions: This sudy shows that many patients with SCI are severely anxious and depressed at the begining of their rehabilitation phase. As an optimistic finding significant reduction in these scores combined across time during the rehabilitation phase. So, it is necessary to follow SCI patients during their rehabilitation stay regarding the presence of depression and anxiety and provide psychological care. Besides, further studies are required to identify the course of such symptoms in SCI patients who live in the community.

OP082

REHABILITATION OUTCOME OF TERROR VICTIMS WHO SUFFERED FROM TRAUMATIC BRAIN INJURY

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Objectives: To describe the functional disability and rehabilitation outcome of 16 terror victims suffered from TBI treated in rehabilitation department between 9.2000 and 9.2003.

Methods: 16 terror victims suffered from TBI out of 65 casualties of terror attacks treated in our department in the last 3 years. There were 9 men and 7 women with mean age 29 ± 10 (16-43).All patients were assessed upon admission and upon discharged from rehabilitation department and at the end of their stay as outpatients in rehabilitation day-care. ADL was measured using the FIM, Cognitive functions and memory was measured using the LOTCA and RBMT batteries respectively.

Results: The mean length of stay of TBI patients was 240 days, 15% in acute care, 31% as in-patients in rehabilitation department, and 54% as out-patients. The mean FIM values improved from 79 upon admission to 122 upon discharged from rehabilitation with 58 % of patients reached normal values. Although both LOTCA and RBMT evaluations improved, they did not reached normal values. Only 33% out of 16 TBI patients returned to their previous occupation These results will be compared to the outcome of 50 non-Terror victims TBI patients who were treated in our department at the same period.

Conclusions: Terror victims usually recovered from their injury after a long rehabilitation period. They gained most of ADL functions but more than 50% are not returning to their previous occupation, probably due to psychological or cognitive consequences. The factors determined the outcome of rehabilitation of Terror victims TBI patients will be discussed.

OP083

THE CORRELATION BETWEEN SURFACE ELECTROMYOGRAPHIC ANALYSIS, MOTOR FUNCTION AND SPASTICITY IN HEMIPARETIC UPPER LIMB AFTER STROKE: A PILOT STUDY.

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Objective: Upper extremity hemiparesis is a leading cause of functional disability after stroke. Functional motor impairment and spasticity in the hemiparetic limb are important factors in the post-stroke rehabilitation. The aim of this study was to identify whether the surface EMG (SEMG) recordings are related with functional motor impairment or spasticity.

Methods*:* In 14 stroke patients (6 men and 8 women, mean age 58.85 years, mean time after stroke, 7 months) we measured spasticity in hemiparetic limb with the Modified Ashworth Scale (MAS). The upper limb subset of the Fugl-Meyer Assessment Scale (FMAS) and Brunnstrom's Scale were used to determine motor performance. Patient's mental and psychological statuses were evaluated with Mini Mental Status Examination (MMSE) and Beck Depression Index, respectively. SEMG potentials were recorded in four different conditions separately: at rest, active, passive wrist extension and isometric wrist extension against resistance. The unaffected sides of these patients were used as a control group in this study.

Result: SEMG potentials were lower in hemiparetic limb than unaffected side ($p<0.05$). There was a correlation between FMAS (or Brunnstrom's Scale) score and SEMG potentials in active and isometric motion ($p<0.05$). No significant relationship was observed between motor impairment scales and SEMG potentials at rest and passive motion. There was a poor correlation between MAS points and SEMG potentials.

Conclusions: There is a meaningful relationship between SEMG potential and motor function. Then, SEMG technique, as a more objective procedure, can be used in determining and predicting clinical outcomes in the post-stroke rehabilitation. Based on these results, in contrast to our expectation the MAS isn't sensitive enough to evaluate spasticity in such studies.

OP084

EFFECT OF ALENDRONATE ON BONE MINERAL DENSITY IN SPINAL CORD INJURY PATIENTS

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Design: Prospective, randomized control trial.

Objective: To evaluate the effect of alendronate on bone mineral density (BMD) in chronic spinal cord injury patients.

Setting: The outpatient clinic of a university-based rehabilitation center in Sao Paulo, Brazil.

Patients: Nineteen chronic spinal cord injury patients.

Interventions: The control group received daily 1000mg of calcium and the experimental group daily 1000mg of calcium and 10mg of alendronate, during six months.

Main outcome measures: Twelve densitometric parameters were analyzed with the use of total body dual energy x-ray absorptiometry (DEXA) at baseline and after six months.

Results: The experimental group presented an increase in measurements in nine parameters (only two with statistic significance) and in the three remaining there was hardly any variation. In the control group, only one parameter presented a positive variation, while the remaining 11 parameters remained unaltered or showed loss.

Conclusion: The use of alendronate had a positive effect on BMD in spinal cord injury patients, therefore represents a potential tool in the prevention and treatment of osteoporosis in this group.

OP085

THE EFFECTIVENESS OF LOCOMOTOR THERAPY IN PATIENTS WITH CENTRAL AND PERIPHERAL NERVOUS SYSTEM INJURY.

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Objectives: To describe our initial experience using the LOKOMAT system (Hocoma) for locomotor therapy in SCI, TBI, stroke patients and others. Introduction: Locomotor therapy by treadmill stimulation with partial body weight support is evolving as a very promising treatment concept for spinal cord and brain injury patients. Several studies have shown its potential in patients after stroke, spinal cord injury and TBI. Using a robotic orthosis (DGO) instead of the regular training has several advantages mainly that the work of the therapists is more efficient, therefore facilitating longer and more physiological training periods.

Methods: Population: In the initial period, we treated 10 SCI patients, 5 Complete (ASIA A) and 5 Incomplete (ASIA C and D), 1 patient with MS, 1 patients with CIDP,1 patient with Guillain Barre Syndrome, 1 patient with Critical Illness Neuropathy, 1 patient with

TBI and 3 patients after CVA. Method: We used the DGO system (LOKOMAT) which was developed at the University Hospital Balgrist in Zurich, Switzerland. This system includes a harness system, a specialized treadmill (LOKO spezial Woodway GmbH Germany) and a mechanical system that moves the legs of the patient in a physiological way. Patients' evaluation includes motor assessment, walking abilities, endurance, spasticity evaluation, pain assessment, FIM, SCIM and NIH scores. The treatment protocol is 30 minutes a day, 3 times a week, for 8 weeks.

Results: None of the patients reported any serious side effects and all of them expressed positive feedback. Over the course of training, there was a significant increase in treadmill walking speed ($p = .0006$), in treadmill walking distance ($p = .0001$), and in treadmill walking time ($p < .001$). Endurance was also improved. In some patients reduced spasticity was noticed for several hours after the training. The functional results of the training in our patients will be presented.

Conclusions: The combination of assisted treadmill training and partial body-weight support allows severly affected neurological patients to perform locomotor training efficiently.

OP086

RELIABILITY OF PROVOCATIVE PHYSICAL MANEUVERS IN THORACIC OUTLET SYNDROME

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Objectives: The aim of this study was to investigate inter- and intratester reliability of provocative physical maneuvers in thoracic outlet syndrome (TOS), and to find the most suitable clinical tests for the diagnosis of TOS in clinical and scientific work.

Methods: Forty patients (25 males, 15 females, mean age: 27.2 ± 7.5) with the diagnosis of TOS were included in this study. Provocative physical maneuvers including Adson, Roose, hyperabduction, hyperextension, pectoralis minor, costoclavicular maneuvers, and pectoral and erb tenderness were performed by two observers at different times for intertester reliability and only selected observer evaluated the patients two times within 10 days for intratester reliability. Internal consistency was assessed by computing Cronbach alpha and test-retest stability was assessed using intraclass correlation coefficients (ICC).

Results: Complaints of the patients were numbness (82.5%) and pain (45%). The most frequent factor aggravating these symptoms was working in a position of upper limbs above shoulder level (42.5%). The ICC showed highly significant reproducibility in the intra- and interobserver assessment of the all tests except pectoralis minor maneuver and tenderness. Statistical results were as follows: ICC = 0.41 ($p=0.004$) and cronbach a = 0.58 for adson; ICC = 0.60 ($p<0.001$) and cronbach a = 0.75 for hyperabduction; ICC = 0.87 ($p<0.001$) and cronbach a = 0.93 for Roose; ICC = 0.54 ($p<0.001$) and cronbach a = 0.70 for hyperextension; ICC = 0.08 ($p=0.3$) and cronbach a = 0.15 for pectoralis minor; ICC = 0.51 ($p<0.001$) and cronbach a = 0.67 for costoclavicular; ICC = 0.85 ($p<0.001$) and cronbach a = 0.92 for erb tenderness; ICC = 0.11 ($p=0.75$) and cronbach a = -0.24 for pectoral tenderness

Conclusions: In this study most of the provocative maneuvers were found to be reliable. We suggest that these clinical tests can be used to assess the neurologic and vascular components. The presence or absence of these tests neither confirms nor eliminates the diagnosis of TOS. It is important to understand what these tests represent.

OP087

EFFECTIVENESS OF PHYSICAL THERAPY ON THORACIC OUTLET SYNDROME.

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Objectives: Thoracic outlet syndrome (TOS) is an important and very common problem. Often, however the patient referred with a clinical suspicion of TOS may eventually receive another diagnosis. There are several treatment methods but none has been specifically approved. Physical therapy (PT) and exercises play an important role in the treatment of TOS. The purpose of this study is to compare the effectiveness of PT + exercise with only exercise on patients with TOS.

Methods: 31 patients (17 women, 14 men) between 37 and 53 years old (mean age 45.4 ± 6.2) were included the study. The patients divided into two groups. The first group was PT + exercise group, the second group was only exercise group. The first group took PT (Ultrasound, hot pack, TENS) and specific TOS exercise. The second group took only specific TOS exercise. No additional treatment was allowed. Follow-up assessments were made at 10th day, 1st and 3rd month after the therapy. Visual analogue scale (VAS) Adson and Rose test were used at the assessment of the patients.

Results: All parameters showed statistically significant improvement within groups ($p<0.05$). VAS, Rose and Adson test were statistically insignificant between groups ($p>0.05$).

Conclusions: This result shows us both physical therapy combined with exercise and only exercise are useful in the treatment of TOS. However physical therapy has no extra advantage in the treatment of TOS patients.

OP088

BURDEN OF CAREGIVING AND HEALTH-RELATED QUALITY OF LIFE OF CAREGIVERS OF STROKE SURVIVORS

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Objectives: The aim of the present study was: (1) To examine the relationship between caregiver burden and health-related quality of life (HRQoL) of family caregivers of stroke survivors; and (2) To examine which characteristics of patients and caregivers relate to increased burden.

Methods: One hundred twenty-two stroke survivors were recruited from in-patient clinics of physical therapy department of Başkent University Hospital. Caregivers were interviewed using Zarit Burden Interview (BI) and SF-36 Health Survey. Functional status of patients was assessed using Modified Barthel Index.

Results: Caregiver burden was significantly related to worsening HRQoL. Mental health, emotional role limitations and vitality were the most impacted dimensions of SF-36, even after controlling for caregiver age, gender and chronic illness, and care recipient gender and functional dependence. Social functioning, general health and physical role limitations dimensions of SF-36 were also impacted negatively. Care recipient functional status was unrelated to burden. Greater caregiver burden was related to caregiver chronic illness.

Conclusions: Community services need to focus attention on stroke caregiver needs and further researches are needed to test interventions to improve their quality of life.

OP089

DISABILITY, DEPRESSION AND QUALITY OF LIFE AMONG OLDER HEMODIALYSIS PATIENTS

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Objectives: To compare disability, depression, and health related quality of life among older dialysis patients and controls.
Methods: One hundred nine renal failure patients on hemodialysis and 40 controls included in study. Short Form-36, Symptom Checklist 90-R (SCL-90R) and Rivermead Mobility Index were used for assessment.
Results: Dialysis patients, compared with controls, reported significantly more disability ($p<0.05$). These patients had also higher depression scores ($p<0.05$)(Table 1). Dialysis patients reported lower quality of life than did controls ($p<0.05$) (Table 2). Disability and depression were significantly related in the dialysis patients ($r:-0.171$, $p= 0.037$).
Conclusions: Older dialysis patients had lower health related quality of life scores. Physical disabilities in dialysis patients are common and lead to increased frailty and greater dependence on activities of daily living. Exercise should be design for dialysis patients properly. Even minimal attention to improving physical function results in significant benefit.

OP090

ISTANBUL COMMUNITY BASED PROGRAM- DISABILITY PREVALENCE IN THREE PILOT REGIONS

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Objectives: In order to make realistic planning in the field of rehabilitation services, determination of number of disabled needing these services is mandatory. According to population census 2000, prevalence of disability is 1.82%. According to Turkey Disability Study that was finished in 2003, disability prevalence in Turkey was found to be 12.29 % . There are wide discrepancies between prevalence rates not only in our country but thoughout the world. The aim of this study, is to determine the actual number of disabled people in order to provide various kinds of rehabilitation services according to their needs.
Methods: Metropolitan Municipality of Istanbul (MMI) had initiated Istanbul Community Based Rehabilitation Program (I-CBRP) which is a model program for providing rehabilitation service network, promoted firstly by World Health Organization in 1980s. Pilot studies have been started firstly at Kağıthane (2002); then at Bağcılar and Fatih districts (2003). Local rehabilitation units are established in each district . Disabled persons are determined during the "Home Care Program", which MMI carried out concurrently. Three trained nurses in each unit made the registrations of the disabled persons either at their homes or in the unit. After 22 months of implementation , 4460 person with disabilities in three districts were recruited to I-CBRP.
Results: In the present study , covering three districts of Istanbul where total of 1.238.795 people live, target disabled population determined by the "Home Care Program" was 7313.. According to this, ratio of disabled persons was 0.59%. The ratio of the reached population of disabled to the target population was 60.9 %. Socio-demographic characteristics of disabled persons, their disability types and social security status were determined.
Conclusion: According to the authors' opinion, the essential value in these kinds of studies is the actual disability rate which indicates the number of the ones who are dependent in their daily living. The expected disability prevalence that will be obtained at the end of I-CBRP in these three districts , of which 60.9 % was completed, will be around 1.5%. The reasons of the discrepancies between the ratios will be discussed.

OP091

EFFICACY OF OPEN VERSUS CLOSED KINETIC CHAIN EXERCYSES FOR PATIENTS WITH PATELLOFEMORAL PAIN SYNDROME.

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Objectives: The purpose of this study was to compare the functional capasity and pain efficacy of open versus closed kinetic chain exercises at patients with patellofemoral pain syndrome.
Methods: Thirthy patients with diagnosis of patellofemoral pain syndrome were randomly selected to form two groups. Each group who where consist of in 15 patients was treated by three times per week for 6-week program that included only closed kinetic chain exercises or only open kinetic chain exercises. All patients were evaluated before the beginning of their exercise program and after 6 weeks of training, 3 months after beginning of their exercise program on several outcome measurements. They were reviewed again Pain during the night, walking, sitting and stepping up-down was evaluated by VAS. Functional level was evaluated by Kujala Scale, squat test, step test and tripple jump test. Strength of the hamstring, quadriseps femoris and hip adductors was measured by 10 RM.
Results: At initial evaluation, statistical analyses did not reveal significant differences for pain, functional level and muscle strength measurements between the closed and open kinetic chain exercise groups($p>0,05$). At the end of the 6 weeks, and 3 months , both groups experienced a statistically significant improvement in pain, functional level and muscle strength($p<0.01$). However statistical analyses did not reveal any significant differences between the closed and open kinetic chain exercise groups($p>0,05$).
Conclusions: As a result, in this study, the effectiveness of both open and closed kinetic chain exercise programs on pain, function and muscle strength were detected in patients with patellofemoral pain syndrome.

OP092

THE EFFECT OF KNEE JOINT HYPERMOBILITY ON JOINT POSITION SENSE

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Objectives: Deficits in proprioception have been identified among

those with hypermobility syndrome. Proprioception as the detection of the onset and direction of knee joint displacement was found impaired in these subjects. The aim of this study is to evaluate joint position sense of the knee in hypermobile subjects.

Methods: Thirty-five healthy volunteer college students with a mean age of 19,63 ± 0,92 were included in the study. Three patients with clinical conditions (trauma and operation at the lower extremity) that may alter proprioception were excluded. Nineteen of 32 subjects were found to have generalized joint hypermobility according to the Beighton scoring system. Ten subjects had knee joint hypermobility (hyperextension more than 10° and hyperflexion). Proprioceptive assessment was done with Cybex Norm dynamometer. Reproduction of active (RAP) and passive repositioning (RPP) at 15° and 40° flexion positions into both flexion and extension directions were tested. The physical activity as sports and dance participation was also questioned.

Results: The mean ages of subjects with and without hypermobility were 19,63 ± 1,01 and 19,61 ± 0,89 respectively. There was no significant difference in terms of age and physical activity between the subjects with knee joint hypermobility and those without ($p>0.05$). Subjects with generalized joint hypermobility had poorer joint position sense in most of the measurements but this was not statistically significant ($p>0.05$). When subjects with knee joint hypermobility were compared to those without knee joint hypermobility, in all measurements they had poorer proprioceptive acuity but only borderline significant differences were found in RPP at 40° flexion ($p=0.05$) and at 15° extension ($p=0.054$).

Conclusions: The subjects who have knee joint hypermobility may have poorer knee joint position sense although they do not have any musculoskeletal symptoms.

OP093

THE EFFECTS OF DAILY, EVERY OTHER DAY 10 MG ALENDRONATE AND CALCITONIN TREATMENT ON BONE MINERAL DENSITY IN OSTEOPOROTIC MEN

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Objectives: Biphosphonates have been widely used in the treatment of osteoporosis in women, whereas there are no enough data on their use in men. The aim of this study is to investigate the effects of 12 months treatment with daily 10 mg alendronate, every other day 10 mg alendronate and daily 200 IU calcitonin on bone mineral density (BMD) in men with osteoporosis.

Methods: 46 men with osteoporosis are randomly allocated to three groups: 15 patients in the first group received daily 10 mg alendronate (Fosamax®) and 1000 mg/day calcium, 14 patients in the second group used every other day 10 mg alendronate and 1000 mg/day calcium and 17 patients in the third group were given intranasal salmon calcitonin at a dosage of 200 IU/day (Miacalcic®) and 1000 mg/day calcium. At the baseline, 6th and 12th months, BMD were measured at lumbar spine (L2-4), neck of femur and femoral ward's triangle zone by means of dual energy x-ray absorptiometry (LUNAR).

Results: In daily, every other day alendronate and calcitonin groups, there were a significant increase in BMD at lumbar spine (p=0,004, p=0,001, p=0,04), but no difference at the femoral neck (p>0,05) at the end of 12th months .Only calcitonin using group showed a statistical difference at femoral ward's triangle ($p<0,05$). When the groups were compared with each other, no significant differences in BMD levels at lumbar spine, neck of femur and ward's triangle were found (p>0,05). Visual analog and Beck depression scales scores revealed pronounced difference between baseline, 6th and 12th months in all groups ($p<0,001$).

Conclusion: Daily, every other day 10 mg alendronate and 200 IU/day calcitonin increased BMD scores at lumbar spine at the end of one year treatment. Long term follow up studies are needed to evaluate the effects of antiresoptive agents on BMD, fracture reduction rate and bone quality in men.

OP094

THE COMPARISON OF THERAPEUTIC EFFECTS OF FUNCTIONAL ELECTRICAL STIMULATION AND JOHNSTONE PRESSURE SPLINTS ON THE UPPER LIMB IN CHILDREN WITH CEREBRAL PALSY

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Objectives: The purpose of this study is to compare the effects of functional electrical stimulation (FES) and Johnston pressure splints (JPS) combined with neurodevelopmental therapy (NDT) on the wrist in children with hemiplegic cerebral palsy (CP).

Methods: Twenty-four children (age range 4-11 years) with a diagnosis of spastic hemiplegic CP were enrolled in this study. Children were randomly divided into FES group and JPS group. Each group consisted of 12 participants. All participants were treated supplementarily by NDT. Assessment tests were carried out monthly in terms of hand functions, passive wrist extension and spasticity.

Results: Passive wrist extension and hand function measurements were improved in both groups ($p<0.05$), without a significant superiority to each other between the groups ($p>0.05$). Spasticity measurements decreased significantly in both groups ($p<0.05$). Improvement in spasticity in the JPS group was significantly better 2nd month ($p<0.05$) but the superiority disappeared at the 3rd month ($p>0.05$).

Conclusions: Hand functions and motions improved in both groups after application of FES or JPS on wrist extensor muscles. Our results showed that both FES and JPS combined with NDT may be useful treatment choices in children with CP who have trouble in using their upper-limbs.

OP095

FUNCTIONAL RECOVERY OF THE HEMIPLEGIC PATIENTS : THE EFFECT OF AGE

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Objectives: Stroke has become an important health problem with the high mortality and morbidity rate. Aging is an unmodifiable risk factor for stroke. In this study the functional improvement of the middle aged stroke patients was compared with the results of the older patients.

Methods: 218 patients with ischemic or haemorrhagic stroke were included in the study. Patients were classiffied into two groups according to age. The data was collected from the medical records. Motor function in hemiplegic patients was evaluated by the

Brunnstrom's test. Ambulation level was graded as level 1: nonambulatory, level 2: ambulation for exercise, level 3: household ambulation, level 4 : community ambulation.

Results : There were 99 patients under 65 years old (mean age was 53.9±7.6 years) and 119 patients older than 65 years old (mean age was 71.7±5.1 years). Most of the older patients were women (63.86%). Average length of stay was 42.04±17.3 days for younger patients and 40.3±18.1 days for the older patients (p>0.05). Motor function and ambulation level in hemiplegic patients are shown in table 1 and 2. The patients under 65 years old had 73 (73.7%) ischemic and 26 (26.3%) haemorrhagic stroke. In the older group 101 (84.8%) had ischemic, 18 (15.2%) had haemorrhagic stroke. The risk factors were hypertension 47.7% , DM 21.2% , and smoking 24.4% in the younger group and hypertension 89%, DM 29.4% and smoking 10.9 % in the older group.

The etiology of stroke and length of stay were similar in the both of the groups (p>0.05).

Conclusion : Ambulation level was better in the younger patients at the end of the inpatient rehabilitation program however Brunnstom's motor recovery stages didn't differ between two groups.

OP096

BLADDER STORAGE AND EMPTYING DISORDER FREQUENCIES IN HEMORRHAGIC AND ISCHEMIC STROKE PATIENTS WITH BLADDER DYSFUNCTION

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Objectives: Bladder dysfunction is common in stroke patients and evaluation of bladder function and management of the disorders should be recognised as part of the routine rehabilitation. The objective of this study was to investigate the frequencies of urine storage and emptying disorders in hemorrhagic and ischemic stroke patients who underwent urodynamic tests because of persistent bladder dysfunction.

Methods: A total of 30 stroke patients (9 males, 21 females) (8 hemorrhagic, 22 ischemic stroke) who underwent urodynamic tests because of bladder dysfunction were evaluated retrospectively. Urodynamic investigations were performed using a Libra+ (MMS, Enschede, The Netherlands) urodynamic measurement system. Urine storage disorder was defined as a bladder capacity of lower than 300 ml and the patient was accepted as having urine emptying disorder if he or she could not void or had postvoid residual urine of more than 50 ml. Urine storage and emptying disorder frequencies were determined in all patients and were compared in hemorrhagic and ischemic stroke subgroups by Chi-Square test.

Results: Storage disorder was present in 63.3% and emptying disorder in 36.7% of all patients. Storage disorder was observed in 63.6% of the ischemic stroke patients and in 62.5% of the hemorrhagic stroke patients. None of the hemorrhagic stroke patients had emptying disorder while 50% of the ischemic stroke patients had this type of dysfunction. The groups were different with respect to the frequency of bladder emptying disorder ($P<0.02$), but the frequencies of storage disorder were not different ($P>0.05$).

Conclusions*:* The frequencies of bladder dysfunction types are different in hemorrhagic and ischemic stroke patients. Evaluation of the stroke type may be helpful in determination of the type of urinary dysfunction and in choosing the appropriate bladder management strategy, but further studies with larger sample size are needed.

OP097

INTRAARTICULAR INJECTIONS OF HIGH-MOLECULAR-WEIGHT SODIUM HYALURONATE IN THE TRATMENT OF PAINFUL SHOULDER

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Objectives: The shoulder is the site of multipl inflammatory conditions that lend themselves to therapeutic injections.These conditions are associated with pain with loss of range of motions (ROM). The aim of our study was to investigate effectiveness of intraarticular sodium hyaluronate in painful shoulders.

Methods: Forty patients with pain and limited range of motion on their shoulders were enrolled in the study. The patients were divided randomly into two groups. First group were treated with intrarticular 2cc sodium hyaluronate injections.The second group(control) were treated with 2 ml saline injections. Injections were performed 3 times with one week periods. All patients were taught simple home exercise program. Clinical assesment were performed before treatment , one week after each injection and 5 weeks after last injection. At each visit ROM's were recorded and the visual anolog scale(VAS) was used to evaluate pain intensity. In addition Constant-Murley shoulder scale was used to evaluate shoulder function.

Results: Although both treatment regimens resulted significant improvement on pain,ROM and Constant scores , only the diffference between mean external rotation was not statistically significant in control group.When the groups were compared, hyalurinate group showed significantly greater improvement on movement and the night pain and also ROM than placebo group. There were no statistically significant difference on pain at rest, Constant scores between two groups at first, second and third weeks. In last evaluation on 7th week, there were statistically significant difference on pain at rest and Constant scores. The Hyalurinate group showed greater imrovements than control group.

Conclusions: Our results showed that intraarticular sodium hyalurinate combined with home exercise program is effective in improving shoulder pain and disablity in patients with painful shoulder. But we need studies which compares this new therapy with conventional physiotherapy for evaluation of efficacy and and cost effectiveness.

OP098

PROPRIOCEPTIVE ASSESSMENT OF SHOULDER JOINT IN SUBJECTS WITH GENERALIZED JOINT HYPERMOBILITY

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Objectives: Proprioception is the ability to detect the position of body parts with respect to another (position sense) and the ability to detect the onset and the direction of the joint movement (movement sense). It has been suggested that there is alteration of proprioceptive acuity in hypermobility syndrome (HS). The aim of this study is to determine whether hypermobile subjects show any impairment of proprioception at the shoulder joint .

Methods: Forty-one healthy volunteer college students with a mean age of 19,46 ± 0,75 were included in the study. Two patients having conditions that may alter proprioception were excluded. Twenty-two of 39 subjects were found to be hypermobile according to the Beighton scoring system. The subjects' physical activity as sports and dance participation was also questioned. Propriprioceptive assesment was done with Cybex Norm dynamometer. Reproduction of active (RAP) and passive repositioning (RPP) at neutral and 30° external rotation into both internal and external rotation directions were tested.

Results: The mean ages of subjects with and without hypermobility were 19.45 and 19.47, respectively. Hypermobile subjects showed significant differences in RAP at neutral to ER direction (p=0,04) and RAP at 30° ER to IR direction (p=0,03). In most of the measurements they had poorer proprioceptive acuity but it did not reach statistically significance. There wasn't any significant differences between two groups according to the age and physical activity.

Conclusions: The impairment of proprioceptive sensation in HS has previously been reported at the knee joint but there is no study about shoulder joint proprioception in these subjects. Subjects with generalized joint hypermobility may have proprioceptive deficits at the shoulder joint, detected as reproduction of active repositioning even though they do not have any clinical symptoms.

OP099

CORTICAL BONE QUALITY IN POSTMENOPAUSAL OSTEOPOROSIS: OVERECTOMIZED RAT MODEL

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Objectives: A cortical bone quality is also important in osteoporosis and only a few studies described non invasive assessment of the quality of cortical bone in osteoporosis. Bone quality is compromised with bone microarchitecture, bone mineralization and bone mechanical properties. The aim of this study was to investigate the effect of overectomy on rat femur cortical bone quality. Bone mineral density; bone biomechanical parameters, histopathology and Fourier transform infrared spectroscopy (FTIR) were used for the evaluation of bone quality

Methods: 14 female Sprague- Dawley rats (7 overectomized, 7 control) were evaluated. BMD was measured by dual energy X-ray absorbsiometry (Norland 45XR) before ovariectomy and after the 100 day of overiectomy. Biomechanical parameters was measured in femoral midshaft with tensile test using by biomaterial testing machine (MAY 03, USA) using BIOPAC MP 100 Acquisition System Version 3.5.7 (Santa Barbara, USA). Maximum load), stiffness and elastic modulus (Young modulus) were calculated.Histopathological evaluation and FTIR measurement (Mattson Satellite series FTIR system model 3000, USA) were also performed.

Results: BMD, cortical bone biomechanical parameters and cortical thickness were significantly decreased in osteoporotic groups than controls. In FTIR analysis showed that carbonate level was higher and phosphatase level was lower level in osteoporotic rats.

Conclusions: Cortical bone mineral densitometry, biomechanics and mineral properties were changed in osteoporosis and cortical bone quality is important for osteoporosis.

OP100

PREDICTORS OF OSTEOPOROSIS IN MEN

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Objective*:* Osteoporosis is increasingly recognised in males and the aim of this study is to evaluate the predictors of bone mineral density (BMD) in men.

Methods: The study subjects were 193 Turkısh men who admitted to the Social Security Education and Training Hospital because of several other health problems with a mean age of 52,69 year (range 35-65)and a mean body mass index of 26.53 gr/cm^2 (range 18.34 - 36.33). Bone mineral density of the lumbar spine L2-L4 and different sites of femoral head were assesed by DEXA. They were evaluated by a questionnaire and the following items were recorded: demographic information, smoking habits, alcohol consumption,daily calcium intake (cheese, yogurt and milk), physical activity, medical history, previous and current medication. 25 (OH) vitamin D, osteocalcin, PTH, testosterone, estradiol, growth hormone, cholesterol were evaluated. Lateral thoracolomber and anteroposterior pelvis X-rays were taken and were evaluated by the same radiologist as normal, osteoporotic and uncertain.

Results: The majority were (117 patient) educated from primary school. %78.2 of were smoking and %33.7 of the smoking patients' lomber vertebra BMD were osteoporotic. Only 25 patients were drinking a glass of milk regularly and %56.99 of were eating cheese daily. The results of the evaluation of X-rays were; %49.7 osteoporotic, %38,3 normal, %11,9 uncertain. Mean value of 25(OH) vitamin D was 34.2 ng/ml (range: 5,4-133,2 ng/ml) which was low, but in normal ranges. The serum cholesterol concentration range were 100 and 309 mg/dl mean value 186 mg/dl. 115 patients never used alcohol and 20 patients were taking alcohol daily. Logistic regression analysis showed cheese, testosterone, cholesterol, X-ray and interestingly; alcohol intake were the positive predictors of bone mineral density. Smoking was a negative predictor. Also interestingly we couldn't find vitamin D, osteocalcin PTH, estradiol, growth hormone and physical activity as a predictor.

Conclusion: This cross-sectional study showed the relation among BMD and estimated risk factors; calcium consumption, alcohol intake, smoking, testosterone level, cholesterol and X-ray in men.

OP101

STELLATE GANGLION BLOCK WITH LOCAL

ANESTHETIC AND ULTRASOUND IN COMPLEX REGIONAL PAIN SYNDROME: A RANDOMIZED, DOUBLE-BLINDED, PLACEBO CONTROLLED STUDY

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Objectives: To compare the effects of stellate ganglion block (SGB) with local anesthetic and ultrasound (US) in addition to physical therapy (PT) in complex regional pain syndrome (CRPS) Type 1 in a randomized, double-blinded, placebo controlled study.
Methods: 20 patients with the diagnosis of CRPS of their upper limb were divided randomly into three groups. PT (exercise, contrast bath, TENS and pneumatic compression) was applied to all patients two times a day for 15 sessions. In group I, SGB with local anesthetic (1% lidocaine) was applied to 8 patients for 10 sessions. In group II, SGB with ultrasound (3 w/cm2, pulsed) was applied to 6 patients for 10 sessions. In group III, only PT was applied to 6 patients. To avoid the placebo effect, saline injection into stellate ganglion for the patients out of group I, and false US application for the patients out of group II were performed. Demographic data and clinical features were collected. Pain severity (VAS), range of motion (ROM) via finger pulp-distal crease distance, volumetric edema, hand grip strength measurements were obtained before treatment and at the final assessment.
Results: The mean age of the patients was 21.6±0.9 years. The mean duration of the disease was 5.2±10.1 months. Pretreatment features of the patients were similar. Right side was affected in 13 patients (%65), left side was affected in 7 patients (35%). Dominant side was affected in 15 (75%). 19 (95%) patients declared a causative event. Improvement in provocative pain score before and after treatment was statistically significant ($p<0.05$) in all groups. In group I difference in improvements of ROM measures, in group II in edema measures, and in group III ROM measures were improved significantly ($p<0.05$).
Conclusions: In this small and underpowered study we found that SGB with local anesthetic and US did not have additional benefit to PT and exercise in CRPS type I.

OP102

THE EFFECT OF PULSED ELECTROMAGNETIC FIELDS IN THE TREATMENT OF CERVICAL OSTEOARTHRITIS; A DOUBLE BLIND,SHAM-CONTROLLED TRIAL.

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Objectives: The purpose of this study was to evaluate the effect of the electromagnetic fields therapy (PEMF) on pain, range of motion and functional status in patients with cervical osteoarthritis (COA).
Methods: Thirty- four patients with painful neck were included in a randomized, double blind study. All patients with symptoms indicating COA, such as a history of mechanical localized neck pain, osteophytes, joint space narrowing, sclerosis of the vertebral margins and subchondral cysts, were diagnozed as having COA. PEMF was administrated to the whole body using a mat 1,8 x 0.6m in size. During the treatment, the patient lay on mat for 30 minutes Per session twice a day for three weeks. The same applications were performed in the control group with the same device but without the PEMF working. The clinical assesment included visual numeric pain score (VAS), active range motion, neck pain and disability scale (NPDS), the presence of paravertebral muscle spasm, before and at the end of the therapy.
Results: No significant difference was found between the groups in terms of age and gender. Pain levels in the PEMF group decreased significantly after therapy ($p < 0,001$) , but no change was observed in the placebo group. The active ROM, paravertebral muscle spasm and (NPDS) scores improved significantly after PEMF therapy ($p < 0,001$) but no change was observed in the sham group. No untoward effects, symptoms, clinical findings or laboratory observations were observed in any patient treated in our study.
Conclusions: In this double-blind randomized sham – controlled trial, PEMF treatment improved the pain, neck ROM , paravertebral muscle spasm and functional status (NPDS) in osteoarthritis of cervical spine. The results of this study are promising that PEMF treatment may offer a potential theurapeutic adjunct to current COA therapies in the future.

OP103

SOCIODEMOGRAPHIC CHARACTERISTICS AND ANTHROPOMETRIC MEASUREMENTS IN PRIMARY SCHOOL CHILDREN

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Objective*:* This study was conducted to investigate the demographic characteristics and anthropometric measurements together with the postural abnormalities in primary school children.
Methods: A total of 1358 children from two primary schools (classes 4-8) were included in the study. One of these schools was a private school from a high socioeconomic part; the other one was a state school from a low socioeconomic part of Istanbul.
Results: The mean age of the children was 12.18±1.47 years, and 55.2% of them were boys. Mean height, bodyweight and body mass index (BMI) were 148.87±11.2 cm, 44.77±12.67 kg, and 19.88±3.58 kg/m^2, respectively. According to BMI results, 26.1% was underweight, 46.6% was overweight or obese. 57.5% had mesomorphic, 22.1% had endomorphic and 20.4% had ectomorphic body type.
Mean time spent with watching television, using a PC and for studying was found as 91.5±55.7, 46.2±49.9 and 91.4±62.8 minutes/day, respectively. As the time spent with television or a PC increased, the ratio of finding abnormal postural findings also increased ($p<0.05$). As the time spent with a PC increased, the ratio of finding inequality of pelvis increased significantly ($p<0.05$). Children in the private school are taller ($p<0.001$), and have a higher BMI ($p<0.001$) than those in the state school, however mean duration of watching TV, using a PC, and studying were statistically similar ($p>0.05$) in both school children. Among the postural problems, we found a 10.7% ratio of scoliosis with physical examination and Adams test. Among all children, 8.6% had static, and 20.4% had dynamic pes planus (total 29%).
Conclusions: Obesity seems to be an increasing problem for Turkish primary school children. Also a relatively higher ratio of underweight children must be taken into consideration. Total time spent without activity is high, and this might underlie the obesity problem.

OP104

COMPARISON OF AEROBIC EXERCISE TRAINING AND VENLAFAXINE TREATMENT IN PATIENTS WITH PRIMARY FIBROMYALGIA

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Objectives: The aim of this study was to compare the efficacy of supervised aerobic exercise training and venlafaxine, alone and in combination, in the treatment of fibromyalgia.

Methods: Eighty-five female patients (mean age=43.1 years) with primary fibromyalgia syndrome according to the ACR criteria were included in the study. The patients were randomly assigned into three groups. The first group (n=30) was treated with venlafaxine 75 mg/daily, the second group (n=24) underwent supervised aerobic exercise (30 minutes, three times a week), and the third group (n=31) was treated with both aerobic exercise training and venlafaxine for 12 weeks. In all groups, pain, fatigue, morning stiffness, depression, anxiety, tender points, global assessment by the physician, short form 36 health survey questionnarie (SF 36) and Hamilton depression scale were evaluated at the beginning and the end of the treatment.

Results: The baseline characteristics were similar among the groups. All groups showed statistically significant improvements in all of the evaluation parameters at the end of the treatment ($p<0.01$). Improvements in pain, fatigue, tender points, global assessment scores and SF 36 scores were significantly greater in group 2 (aerobic exercise)and group 3 (aerobic exercise plus venlafaxine) than that of group 1 (venlafaxine) ($p<0.001$). Also, decreases in anxiety scores of group 3 were also greater than in group 1 ($p<0.01$).

Conclusions: Our results showed that aerobic exercise training and venflaxine (either alone or in combination) were effective in the treatment of patients with fibromyalgia syndrome. However, the better results were gained with exercise training with or without venflaxine, which suggests that exercise training has a great impact in the therapy of fibromyalgia syndrome.

PP001

EARLY REHABILITATION OF RISKY CHILD

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The meaning of prevention treatment of risky childes consider treatment of common stimulation and early habilitation-rehabilitation treatment.

In the first 6 months of 2003. in a Maternity Hospital of Uzice were born 832 children, from whom 167 were hospitaled on Intensive care of Neonatology. From the side of Children Physiatrist was examined 136 babies who were exposed to one or more risky factors. Most frequent factors of risk were premature and hypoxia. Early common treatment of stimulation was begun immediately in hospital, and was continued in ambulance during the whole first year of the life. In the ambulance of Children Physiatrist to each risky child was open a carton and was determined programme of exercises and psychomotor stimulation. Parents were educated for realization of that programme. Following of the development of a risky child was practicing during the whole year. Controls were done once a month. . Following of the development of a risky child have a big diagnostic importance. It helps in early discovering of a specific functional deficient.

At the end of the first year of a life, among the 136 children were separated 5 with cerebral palsy, 1 with cerebral palsy and epilepsy, 1 with psychomotoric retardation, 1 with retrolental fibroplasia. Considering we are dealing with population of a risky children the results are pointing at a need of a beginning of early stimulation and rehabilitation treatment in a Physiatrics Institutions.

PP002

POST VACCINAL POLIOMYELITIS – CASE PRESENTATION

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Objectives and Background: The sudden decrease of poliomyelitis patients has been observed after mass carrying out of polio vaccine. But in most countries where the Sabin oral polio vaccine is in use it is noticed that poliomyelitis can appear sometimes associated with vaccination. Poliomyelitis associated with vaccination can appear at three population groups: vaccine recipients, persons who are in contact with recipients, and patients with imunodephiciency.

Stress the importance of rehabilitation therapy application in the process of treatment patients with flaccidus parapharesis, after post-vaccine poliomyelitis.

Case: Boy N.N. aged six, with flaccidus parapharesis, with proved post-vaccine poliomyelitis. The child was vaccinated with the first Di Te Per and Polio dose on 25.06. 1998. Twelve days after that the diarrhea emerged, high temperature of 38, 3ºC, sleepiness, weakness, convulsions and quadripharesis. He was treated on the Institute's pediatrics clinic, according to flaccidus paralysis protocol. Rehabilitation started on 27.07.1998. Functional status at the beginning of rehabilitation– right leg motionless left leg with minimum active motions. MMT remarks – lower extremities from 1-2, for m tbialis ant.dex. mark is 0. On the upper extremities without active motions on brachium region. MMT for UE on the mark 2. Kinesitherapy, electrotherapy ES together with exercise, hydrotherapy, work therapy is carried out, during the walking phase the upper leg orthosis are applied. The boy is under treatment all the time with small breaks.

Results: The boy is six now. Parapharesis is still on. He can walk by himself on the wide basis. He is wearing peroneal device for the right leg, with the 1, 5 cm ascend. Marks on MMT for the right leg from 1-3, and for the left leg 3-4. Upper extremities from 4- to 4+. Psyche status conserved. Has got regular controls at the neurologist.

Conclusion: We emphasize the importance of continuous rehabilitation and orthosis use in training children for walking and everyday activities, after post vaccine poliomyelitis.

PP003

THE EFFICACY OF BEHAVIORIAL MODIFICATION PROGRAMME AND PRESSURE BIOFEEDBACK METHOD IN CHILDREN WITH FECAL INCONTINANCE DUE TO ENCOPRESIS

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Objectives: To evaluate the efficacy of pressure biofeedback method in addition to the behavioral modification program on anorectal function and continence restoration in children with fecal incontinence due to encopresis.

Methods: Eight children (6 boys and 2 girls) were enrolled in the study. During the first four weeks, behavioral modification program including toilet training, fiber rich diet and conditioning was applied. The following four weeks, pressure biofeedback method in addition to the behavioral modification program was applied for 60 min two times a week to the children with persistent fecal incontinence. Anorectal function and quality of life were assessed with manometric measurements using pressure biofeedback device, Wexner and Holschneider scale and defecation list performed at baseline, during treatment period and the first month of the following period.

Results: Mean age was 10.1±2 years and mean duration of symptom was 4.6±2.7 years. Significant decrease in resting pressure was detected in manometric anal measurements at the end of the study and the following period ($p<0.05$, respectively). Although a reduction trend was observed in maximum squeeze pressure, this reduction was not statistically significant. A decrease in sensory threshold and an increase in time for half of the maximal squeeze pressure were observed in the manometric pressure measurements ($p<0.005$). A significant improvement in the quality of life and in the severity of incontinence was also found at the end of the study and during the first month of the following period($p<0.05$)

Conclusions: Our study suggests that application of the pressure biofeedback method in addition to the behavioral modification program significantly improved anorectal functions and the quality of life in children with fecal incontinence due to encopresis.

PP004

DEMOGRAPHIC DATA OF THE PEDIATRIC SPINAL CORD INJURIED PATIENTS

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Objectives: To asses demographics, causes, neurologic presentations, complications and functional outcome of the spinal cord injury among children.

Methods: In this study, pediatric spinal cord injured patients were retrospectively evaluated for their clinical and demographical data.

Results: Forty-three children with spinal cord injury were included in this study. Twenty- eight were male and fifteen were female, their mean age was 11.8 ± 3.6. The major etiological factor was motor vehicle accidents with 39.5%. The most common level of neurologic injury was the thoracic region with 67.5% and followed by lumbar region with 20.9% and cervical region with 11.6%. Neurological syndromes on presentation were ASIA A in 25 (58.1%) patients, B in 3 (7.0%) patients, C in 4 (9.3%) patients, D in 2 (4.7%) patients and cauda equina syndrome in 9 (20.9%) patients according to ASIA Classifications. The average length of stay in hospital was 66.37 ± 33.22 days. The most commonly encountered complication during to hospital stay was urinary infection with 55.8%, followed by pressure ulcers with 46.5%, spinal deformities with 32.6% and contractures with 27.9%.

Conclusions: Although spinal cord injury is relatively uncommon in children, the cost to the child, family and society is immense. So, preventative measures should be tailored according to childhood.

PP005

THE ANAL PLUG IN THE TREATMENT OF FECAL INCONTINENCE IN MYELOMENINGOCELE PATIENTS

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Objectives: Fecal incontinence can be a distressing and embarrassing problem, and quite difficult to cope with. Ninety percent of patients with myelomeningocele (MMC) are affected by urinary incontinence and more than 75% suffer fecal incontinence as well. The range of products designed to cope with fecal incontinence is very limited. Most patients are obliged to use absorbent pads designed for menstruation and urinary incontinence. In many incidences these pads do not adequately control fecal leakage, which can lead to skin irritation.

The anal plug has been developed to prevent loss of stool. It has been adapted from a stoma plug. It consists of cup shaped foam plug with a gauze string for easy removal.

The aim of our study was to evaluate the objective and the subjective influence of the anal plug in MMC children.

Methods: Subjects: We included 20 children, both male and female, with MMC, aged four and above, who suffer from fecal incontinence.

Study design: self-controlled clinical trial. Each child was evaluated three times. The period between the first two evaluations was considered a control period. The child used the anal plug for one month between the last two evaluations.

Results: This poster will present our findings of how well the children tolerated the anal plug, how the frequency of fecal leakage changed with its use and the impact of the anal plug on their quality of life.

PP006

REHABILITATION OF A SIAMESE TWINS (PARAPAGUS CONJOINED TWINS)

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Objectives: The incidence of conjoined twins is reported to be in the range of one in 50.000-200.000 live births and they are classified according to the most prominent site of union. Parapagus is the term used where there is extensive side-to-side fusion and this is a rare form of conjoined twins.

Methods: The rehabilitation of a female parapagus conjoined twins is presented in this case report.

Results: They were 3 years old and referred to our department with the complaint of inability to walk. They had two heads, four arms, two thoraxes fused below the level of nipples, one shared liver, shared abdominal aorta and inferior vena cava, two seperate vertebral columns met at the sacrum, a shared pelvis with shared genitourinary organs and two legs. As a result of their fusion operative care was considered to be unacceptable. Somatosensorial evoked potential evaluation showed that twin A controls the right leg and twin B controls the left. Although they were able to belly crawl using upper extremities for forward progression, they could not sit or stand without support.

Conclusions: After two months of inpatient rehabilitation program consisting both upper and lower extremity reeducation, balance-coordination and walking training; they were able to walk independently with modified shoes and a specially designed walker.

PP007

THE DEMOGRAPHIC FEATURES OF CHILDREN ATTENDING THE CEREBRAL PALSY OUTPATIENT CLINIC:PRELIMINARY RESULTS

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Objectives: The aim of this study was to determine the demographic features of children with cerebral palsy (CP) attending the 3rd Physical and rehabilitation Medicine outpatient clinic.
Methods: A datafile was designed and, performed by medical staff during the patient visits. A descriptive study of data obtained since year 2003 is reported .
Results: Seventy four CP patients with the mean age 6.15 ± 3.35 (40 boys-34 girls) visited the clinic during the study period.The type of CP was spastic in 64 patients(86 %) ,dyskinetic in 5 (6.75 %) ,and mixed in 5 (6.75 %9). The most frequent etiologic risk factors were asphyxia,low birth weight preterm labor and postnatal convulsions.Prevalence of comorbidities showed the highest frequency of musculoskeletal deformities followed by speech-language pathologies,vision and hearing problems respectively. Gross motor function was performed in 30 patients.
Conclusions: The cerebral palsy rates reported here may reflect the social and demographic features unique to our clinic in Istanbul and should be used with caution in making comparison with other populations.

PP008

EVALUATION OF SYMPTOMS OF LOWER URINARY SYSTEM DUE TO NEUROGENIC BLADDER AND DETERMINATION TYPES OF BLADDER IN CHILDREN WITH CEREBRAL PALSY

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Objectives: To evaluate symptoms of lower urinary system, to determine the type of bladder in children with cerebral palsy (CP) and to find out the relation of them with daily living activities and mental status.
Methods: A total of 41 children with CP (25 boys and16 girls) aged between 5-12 years old were included in the study. Symptoms of lower urinary system were asked. All cases underwent urodynamic analysis in order to determine the types of their bladders according to the classification of Krane-Siroky. For every children, expected bladder capacity was calculated with the formula which was developed for healthy children. After the urodynamic analysis, cases were divided into two groups depending on the bladder type; as hyperreflex neurogenic bladder and normal bladder. Independence level of daily living activities was evaluated with Functional Independence Measure of Children (WeeFIM). Intelligence was evaluated with Stanford-Binet Intelligence- Quotient (IQ) Scale.
Results: 30 children with CP had hyperreflex detrussor, coordinated sphincter while 11 of them had normal bladder. None of them had areflex detrussor or dyssynergic sphincter. There were statistically significant differences between groups in terms of bladder capacity, stress incontinence, complaint of frequent urination and IQ scores ($p<0.05$). There was no statistically significant difference in terms of total WeeFIM scores. Sphincter subscores of WeeFIM showed statistically significant differences between two groups ($p=0.001$). According to logistic regression analysis, total WeeFIM scores and sphincter subscores of WeeFIM facilitated classification of the bladder type ($p<0.05$), while IQ scores were not important in predicting the bladder type ($p>0.05$).
Conclusions: Urinary symptoms should be evaluated in children with CP. Especially in symptomatic children, urodynamic analysis should be performed in order to determine the bladder dysfunction as early as possible when these children can cooperate. So, treatment can be planned objectively.

PP009

THE DIAGNOSTIC DISTRIBUTION OF THE CASES FOLLOWED IN THE PEDIATRIC REHABILITATION UNIT AND THE FREQUENCY OF ORTHOSES USAGE

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Objectives: To evaluate the diagnostic distribution, musculoskeletal deformities and orthoses usage for the cases followed in the pediatric rehabilitation unit.
Methods: 504 disabled children followed in our hospital have been evaluated and their diagnose, their body, upper and lower extremity deformities and orthoses have been recorded.
Results: 307 of the cases were male and 197 were female. The diagnostic distribution of the cases: 73.4% cerebral palsy, 6.3% meningomyelocele, 3.8% brain injury, 2.8% muscular dystrophy, 2.0% spinal cord injury and 11.7% had different diseases. It has been observed that 5.6% of the cases had body deformity, 6%, had upper extremity and 76.3%, had lower extremity deformity. 82.1% of the ones with body deformity had scoliosis. 83.3% of the ones having upper extremity deformity had elbow flexion, 13.3% of them had wrist flexion. 61.9% of the patients had lower extremity deformity. 40.7% of the lower extremity deformities were equinus, 9.3% were genu recurvatum, 7.7% were knee flexion, 5.4% were equinus and genu recurvatum deformities, 5.1% were equinovarus, 5.1% were knee flexion and equinus deformities. 61.1% of the cases have used body jacket typed corset, 22.2%, thoracolomber corset, and 16.7% of them have used thoracolumbosacral orthoses. 29.7% of the cases, Ankle-Foot Ortheses (AFO), 23.8% of them, genu recurvatum orthoses, 30.1%, Knee-Ankle-Foot Ortheses (KAFO), 11.9%, KAFO with pelvic belt, 3.7% of them articulated AFO have been used. 85.1% of the cases, Thermoplastic KAFO, 62.8%, elbow static splint, 14.9%, PAFO, 20.2%, hand-wrist resting splint and 17% of the cases, elbow and hand-wrist splint have been used together.
Conclusions: Body and extremity deformities are often seen in disabled cases. Usage of orthoses should be taken as a part of the rehabilitation in order to stop the formation of the deformities and to sustain functionality.

PP010

BOTULINUM TOXIN A INJECTION FOR SPASTICITY IN DIPLEGIC TYPE CEREBRAL PALSY

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Objectives: Botulinum toxin type A can be both safe and effective in relieving spasticity in pediatric cerebbal palsy patients. In our prospective study we evaluated the functional effect of Botulinum toxin A in spastic $iplegic type cebebral palsy.
Methods: Patients were examined on enrollment and at 1, 3 and 6 months after injection. Passive dorsiflexion of ankle joint was measured using goniometer as an angle of possible maximal dorsiflexion with knee extended and flexed. Spasticity was graded using modified Ashworth scale. Selective motor control at ankle was assessed and observational gait analysis was done. Functional status of patients gas determined by using gross modor classification system (GMFCS). Botulinum toxin A(10 IU/kg) was injected into

gastrocnemius/soleus muscle in all patients and in four patients with concomitant jump knee gait and also hamstring muscles injection was added.

Results: Eleven patients were included in the study. Mean age was 58.81±15.34 months. Following injection, spasticity was clinically decreased and statisticaLly significant)mprovement was noticed in all clinical parametebs after 1, 3 and 6 months of injection. The imp2ovement in the clinical parameters decreased after 6 months but not to the baseline. One patient was level two, four patients were level three and six patients were level four according to th% GMFCS at baseline. After six months gross motor classification system was improved and did not to return to the baseline in 9 children

Conclusions: The main goal of spasticity treatment in cerebral palsy is functional improvement. In our study most of our patients had functional improvement according to gross motor function classification system and did not changed at six months. The botulinum toxin acts on the primary problem of hypertonia but the change in tone may affect the child's balance, strength, and motor control as well as secondary problems of malalingment and fix contractures.

PP011

USE OF FUNCTIONAL INDEPENDENCE MEASURE OF CHILDREN (WEEFIM) FOR THE FUNCTIONAL EFALUATION OF TURKISH CHILDREN WITH CEREBRAL PALSY (A PRELIMINARY STUDY)

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Objectives: To evaluate the independency level of daily living activities for children with CP by using WeeFIM method and to compare our findings with healthy children of the same age, with similar socio-cultural characteristics.

Methods: A total of 86 children aged 24 months to 120 months (mo) were included in the study. While 45 of such children had cerebral palsy, 41 of them were healthy. All cases were divided into four age groups as 24-47 mo, 48-71 mo, 72-95 mo, and 96-120 mo, depending on their chronological ages. All children were evaluated by WeeFIM method for independency level of ADL. Five subscores such as self-care, sphincter control, transfer-locomotion, communication-social cognition and a total of WeeFIM scores of CP and healthy children were recorded and compared with each other.

Results: The children with CP had consistently lower WeeFIM scores in all areas than those of the healthy children. The total WeeFIM score and all subscores except sphincter control score of the healthy children progressively increased between the ages of 24 mo and 120 mo. It was concluded that the transfer-locomotion activity was mostly retarded in children with CP and this was the most important determinant in terms of dependency during activities of daily living (ADL).

Conclusions: A comparison of healthy children and others with disabilities requires the consideration of age and social characteristics in all cases. WeeFIM is a useful method to measure the disability of Turkish children with CP and to compare them with their healthy counterparts.

PP012

SECONDARY CONDITION AS THE CAUSE OF HOSPITALIZATION IN CHILDREN WITH DISABILITIES

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Objectives: A secondary condition is any additional physical or mental health condition that is causally related to a primary disabling condition. Secondary conditions often increase the severity of an individuals disability and are highly preventable. This study describes the rate of secondary condition as the cause of hospitalization in children with disabilities and describes its connection to socio-demographic variables and pathology type.

Methods: A randomized sample of 104 children (mean age 8 years range 0-26 years) who were attached to a rehabilitation department during 2002 participated in a cross-sectional descriptive design study.

Results: A secondary condition as cause of hospitalization was 15%. The most frequently reported disability related to hospitalization due to secondary condition was cerebral palsy follow tendon release surgery (N=6), the second was back surgery in children with myelomeningocele (N=3). The childs family socio-economic characteristics found to be related to hospitalization due secondary condition. Children in families of low economic status trend to hospitalize more due to secondary condition.

Conclusions: Secondary conditions are highly preventable by definition but found to be a major reason for hospitalization in rehabilitation in disabled children.

PP013

A CASE OF CONGENITAL ATONIC-SCLEROTIC MUSCULAR DYSTROPHY (ULRICH DISEASE)

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Objectives: A case of congenital atonic-sclerotic muscular dystrophy (Ulrich Disease) was described.

Methods: Case: The patient was a 4 year-old girl with difficulty in walking, torticollis, generalized muscle weakness and congenital hip dislocation with a combination of mild proximal joint rigidity, distal hypotonia and hyperextensibility. High arched palate, protruded calcaneus were also recognised. There was no sensory or intellectual impairment. Muscle biopsy revealed atonic-sclerotic muscular dystrophy. She was diagnosed as Ulrich disease in the light of clinical findings and muscle biopsy result. Mild functional improvement was observed after 10 weeks of rehabilitation program.

Conclusions: This rare condition should be keep in mind in a child with clinical findings such as torticollis, muscle weakness and hypermobility.

PP014

ORAL AND DENTAL HEALTH IN CHILDREN WITH CEREBRAL PALSY

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Objectives: To evaluate the tooth brushing habits (TBH) of the cases with cerebral palsy (CP) regarding to underline the importance given to tooth and mouth care in children with CP clarifies the relationship between tooth brushing habit and mouth hygiene, gingivitis and tooth decays.

Methods: A total of 89 children with CP (45 boys and 44 girls) aged between 3-11 years old were included in the study. Whether the children

with CP had TBH and they receive help during the tooth brushing procedure and the number of their daily tooth brushing has been investigated. Their mouth hygiene, gingivitis and tooth decay have been evaluated. The mouth hygiene has been ranged as good, bad and moderate. The number of tooth decays has been determined. The cases have been divided into two groups such as spastic diplegia and total spastic.

Results: It has been discovered that 49.4% of the cases (44) had TBH but 50.6% (45) had not. The mouth hygiene of the cases who did not have TBH has been found worse than the ones with TBH (p=0.00). Gingivitis and the number of tooth decay has been found significantly higher for the cases with no TBH ($p<0.05$). A significant difference has not been found between the two groups in terms of tooth brushing number, mouth hygiene, gingivitis and the number of tooth decay ($p>0.05$).

Conclusions: The children with CP who do not have TBH have a high possiblility to develop gingivitis and have more tooth decays due to the lack of tooth brushing. The acquirement of TBH for such children by using modified tooth brushes will provide an efficient tooth brushing.

PP015

CONGENITAL INSENSITIVITY SYNDROME: CASE SERIES

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Objectives: Congenital Ynsensitivity to pain with anhidrosis (CIPA) is a rare clinical disorder characterized by recurrent episodes of unexplained fever, absence of reactions to noxious stimuli, inability to sweat. The diagnosis of CIBA based on clinical features. Life span is variable but in 20% of cases death occurs due to hyperpyrexia with in the first three years of life.

Methods: We have four cases with this syndrome.

Results: Case I and II: They were sisters. One of them was a twenty one year-old girl. She had hearing loss due to recurrent otitis media,and also had bilateral humerus and right leg amputations due to neuropathic arthropathy. Charcot joints were also developed at her left hip and knee. The other patient was an 18 year-old girl. She needed arthrodesis of the left knee and ankle because of the very severe Charcot joints. There was also a Charcot joint at her left shoulder. Both of the patients had lip and finger tip ulcerations and amputations because of self-biting. Case III: A four year-old girl with neuropathic artropathy at her ankle joints. She had been hospitalized several times due to febrial periods. Case IV: An eleven year-old boy with Charcot joints of both hips. He had open wounds at the extensor aspect of his wrists which eventually caused necrosis of the carpal bones. He was given orthotics for the flail wrists. He had severe infection at the helix of his right ear and also had hearing loss because of the chronic otitis media.

Conclusions: CIPA is a severe condition that leads to fractures, osteomyelitis and limb amputations in older children. There is no specific treatment for this disease . the most important thing of all is accurate diagnosis and special training programs to prevent self-mutilation and accidental injuries.

PP016

A DIABETIC WITH BELOW KNEE OSTEOMYELITIS – HOW TO FIT HIM WITH AN ABOVE KNEE PROSTHESES OF THE OTHER FOOT?

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Objectives: Diabetes per se causes a myriad of complications, especially microvascular while lower limb diabetic gangrene remains the leading cause of amputations in diabetic patients. Clinically presenting as dry or wet, it can be of foudroyant onset with intoxication and amputation or chronical as soft tissue purulent ulcer that can produce ostheomyelitis foci. The aim of our study is to show specificity and succes rate of diabetic above knee amputees with foot and leg osteomyelitis of the untact limb.

Methods: A 51 year old male with an insulin-dependent diabetes for 16 years, underwent amputation of the second finger of the right foot. Post-op healing delay resulted in fistula formation. A year later, he underwent the same procedure for the left foot, again followed by the same complication. Since, he developped occasional purulent secretions on the both feet. Last January, due to left femoral artery occlusion, an above knee amputation has been performed and he reached our Institute with a fistula of the remaining femur.

Results: After the fistula healed, a transparent test groove corrected for negative pressure were applied and the involution of the soft tissue of the amputation stump has been stabilized. The definite prosthesis was implanted with a hidraulically controlled multiaxial free knee unit, while the right foot was equipped with an orthopedic shoe designed based on a cast model.

Conclusions: Due to application of the longitudinal oval socket prosthesis and assisting knee unit, as well as increased efforts of the prosthetic team, the patient was trained to walk with cane on all the given grounds.

PP017

LOWER-LIMB AMPUTEES OVER 65 YEARS - ACTIVITY OF DAILY LIFE (ADL) IN OUR EXPERIENCE

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Objectives*:* Persons over 65 years with lower limb amputees due to various reasons represent a special patient group in prosthetic rehabilitation. The course of prosthetic rehabilitation is usually obstructed by the clinical features of the underlying condition that led to amputetations (such as diabetes, endartheritis, etc.), as well as the level of motivation due to inability of resuming regular work activities, etc.

Methods: Over a 10-year follow up period, we evaluated patients provided with lower-limb prostheses in hospital setting. The group encompassed 43 patients provided with above-knee prosthesis, 52 with lower limb ones out of which 10 patients had bilateral amputations. After 12 months, using unannounced visits as a method, we rounded on these patients.

Results: Out of 43 above knee amputees only 7 (16.27%) of them wore the prosthesis on every-day basis, 29 patients (67.44%) didnt wear it at all, while 7 patients (16,27%) died meanwhile. Out of 52 lower limb amputees, 41 (78.85) wore it regularly, 6 (11.54%) hasnt, while 5 (9.61%) died. Among the 10 patients from this group who had bilateral amputations, 4 of them (7.7%) used them for short-distance ambulation, while for longer distances they used wheele chairs.

Conclusions: As all of our patients belonged to one age group and had similar underlying conditions, we can conclude that the level of amputation was determining success of prosthetic rehabilitation. Below knee amputees used their prostheses in ADL in 78.85%,

while it has been the case with only 16.27% of the above knee amputees. Therofore, these results should be borne at mind, together with angiography and Doppler analysis, when deciding on the amputation level pre-op, as well as the patients ability for post-op prosthetic rehabilitation.

PP018

PROSTHETIC REHABILITATION COURSE AND OUTCOME INFLUENCED BY STUMP CHARACTERISTICS

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Objectives: The course and outcome of prosthetic rehabilitation depends on various factors among which the immediate prosthetizing procedure is consistent with the amputation stump characteristics which eventually shape the possible complications. The aim of our study was to show the effect of the amputation stump features on the course an overall outcome of prosthetic rehabilitation.

Methods: We evaluated 3 groups of patients, 20 pts each: vascular, traumatic and patients who underwent amputation due to antipersonnel mine (APM) injury.

Results: At the beginning of the rehabilitation 15% of the patients from the vascular group had no complications what so ever, while in the remaining 2 groups, patients did develop complications. Vascular groups patients had an average 3 complications, contractures mainly (75%). Trauma patients developped 7 complications on the average, while the most common one was muscle hypotrophy (95%). Antipersonel mine victims had 4 complications on the average, while muscle hypotrophy (75%) and edema (65%) were the most common ones. During the course of rehabilitation, 45% of the APM victims had no complications, while the most common complication was ligatures abscess (15%). The 20% of vascular patients had no complications, while 25% developped ligatures abscess. The 10% of the trauma patients had no complications, while 25% did develop ligatures abscess.

Conclusions: Evaluating the impact of amputations stumps features on the outcome of the prosthetic rehabilitation, weve come to the conclusion that a statistical difference did exist among the given groups. Vascular patients showed the greatest success because the 80% of patients resumed their everyday life activites, APM victims did so in 75% of the patients, while trauma patients did in 70%. AP mines 75% of the patients hasnt fully resumed their everyday life activites since 45% changed the line of work, while 35% did return to their jobs, but with extended treatment time required.

PP019

THE ASSESSMENT OF AEROBIC CAPACITY IN OBESE PATIENTS

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Objectives: Obesity is a worldwide health problem that affects many organ system. The aim of this study to assess the aerobic capacity and walking capacity in obese patients.

Methods: Twelve obese patients who admitted to our department with a body mass index (BMI) $\geq$ 30 kg/m^2 (mean ±SD; 35.3 ± 5.45 kg/m^2) and 12 lean volunteers (mean ±SD; 22.3 ± 3.37 kg/m^2) who served as a reference were participated in the study. The average age was 41.5 ± 5.56 years in patients and 33.5 ± 6.27 years in control group. Force vital capacity (FVC), force expiratory volume in 1 second (FEV1), peak expiratory force (PEF), vital capacity (VC), maximal voluntary ventilation, peak volume O_2 (PVO_2) and aerobic threshold (AT) and walking in 6 minutes were determined.

Results: There was a significantly difference between two groups for PEF, MVV, AT and walking in 6 minutes ($p<0.0001$, $p<0.0001$, $p<0.05$, $p<0.0001$ respectively). Obese patients walked significantly slower than control groups.

Conclusion: Lower aerobic capacity is considered to be a general characteristic of female obese subjects. We suggest aerobic exercise training for obese patients

PP020

CHANGES IN CAROTID ARTERIES IN VERTEBRO-BASYLAR SINDROM SYMPTOMATOLOGY.

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Objectives: To point out the participation of carotid arteries in cervical syndrom.

Methods: Duplex color Doppler scan of cartid and vertebral arteries with mechanical transducer 7.5 mHz, with ESAOTE BIOMEDICA device.

Scanned patients are divided by symptomatology, diagnoses, sex and age.

By symptomatology:

.1 headache.
.2 vertigo.
.3 dizziness.
.4 other symptomatology with 1, 2, 3.
.5 other symptomatology without 1, 2, 3.

By diagnoses:

.1 changes in vertebral arteries.
.2 carotide arteries angulation.
.3 carotide arteries stenosis.
.4 combination of all previous, and
.5 no changes.

Criteria for patological findings on vertebral arteries:

.1 tortuosities.
.2 elongations.
.3 circulation less than 50 %.
.4 stenotic circulation on perforation through processus transversus.
.5 hypoplasia.

Criteria for carotids:

.1 angulations, kinking, tortuosities.
.2 plaque stenosed over 20%.

Results: In 1000 scanned patiens there was 73.6% with patological findings. By diagnoses:

.1 changes in vertebral arteries are present in 14,8%.

carotid angulations in 47,2%. .2
carotid stenosis in 11,2%. .3
combinations of 1, 2, 3 in 26,8%. .4

Morphologic and organic changes in carotid arteries (58.4%) are by far more present in VB sindrom symptomatology than changes in vertebral arteries (14,8%). Great many of them are angulations, mostly located in AACI, mainly represented in age group over 45 years.

Conclusions: Degenerative changes of cervical spine in numerous cases result in carotid arteries malformations. Changes in carotid arteries are the cau

PP021

RESTLES LEGS SYNDROME, A CLINICAL CASE

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Restless legs syndrome, a clinical case Restless leg syndrome is a neurological disorder characterized by sensory and motor disturbances that patients often describe as discomfort or "pins and needles" in their limbs, mainly in the legs when at rest. The prevalence is estimated to be around 10% in the general population, although it is often underdiagnosed. It may begin at any age but most of the affected patients are midlle-aged or older. Here we present a case of a 59 year-old female patient who was seen at our hospital with discomfort, paresthesias and numbness of both legs. She had these complains for 20 years with periods of remission and exacerbation. The discomfort began in the hips bilaterally and spread distally to the remaining limb. According to the criteria developed by the International Restless Syndrome Study Group – 1) desire to move the limbs, often associated wit paresthesia or disesthesia, 2) symptoms exacerbated by rest and relieved by activity, 3) motor restlessness and 4) nocturnal worsening of symptoms - our patient was diagnosed Restless Legs Syndrome. We present this case in order to stress the importance of keeping in mind the RLS and do not make the mistake of depreciating symptoms often described as vague that is the main reason for the enormous underdiagnosis of this situation.

PP022

THE MUSCULOSKELETAL DYSFUNCTION IN BURN PATIENTS

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Objectives: The aim of this study was to evaluate the effects of musculoskeletal dysfunction due to burn injuries on patients' daily living activities and psycho-social status.

Methods: Twenty-five burn patients (8 women and 17 men, mean age 20,46±20,56) were included in the study. Subjects' demographic characteristics, localization and depth of burns, %total burning surface area (TBSA) and musculoskeletal system complications were recorded. Functional status and life satisfaction of the patients were rated using Functional Independence Measure (FIM), Modified Rankin Scale (MRS) and Short Form 36 (SF 36).

Results: Mean disease duration was 20.64±13.95 months and mean length of hospital stay was 30,96±17,70 days. The depth of burn injury was partial thickness (2nd degree) in 22 patients (88%) and full thickness (3rd degree) in 3 patients (12%). The average of TBSA was 26,48±16,48. There were multiple joint contractures in 11 patients and below knee amputation in one patient. When we compared patients with and without joint contractures, there were significant differences with respect to MRS scores and subscores of SF-36 such as "physical function", "pain" and "vitality". Number of contracted joints and MRS scores were positively correlated with % TBSA. Vitality and emotional status subscores of SF-36 was negatively correlated with % TBSA. When we compared 2nd degree burn injury patients with those of 3rd degree burn injury, there was no significant differences with respect to FIM, MRS and SF-36 scores.

Conclusions: Burn is a trauma that may result with physical, psychological and psychosocial dysfunction if an appropriate rehabilitation program is not conducted.

PP023

RELIABILITY OF THE BIODEX STABILITY SYSTEM IN THE BLIND ATHLETES: A PRELIMINARY STUDY

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Objectives: The visual, vestibular, and somatosensory systems contribute to the maintenance of an upright standing posture in humans. A deficiency in any of these systems may cause a significant change in a person's postural balance. In this study we aimed to evaluate the reliability of the Biodex Stability System (BSS) in the blind athletes.

Methods: Eighteen goal-ball players who were totally congenitally blind were evaluated on two days over one week using BSS. Each day consisted of three adaptation trials and three test evaluations, for a total of six 20-second balance tests at a platform stability of 8. Dynamic postural stability was measured on the basis of three indices: overall, anteroposterior and mediolateral. Means of each day and of the best score of each day were calculated from the three test trials. We evaluated intraclass correlation between the results of the two days.

Results: No significant differences were determined between the mean score on each of the two days or between the mean score and the mean of the best score of each day. Intraclass coefficients for the two testing days ranged from 0.59 to 0.83 based on the mean value, and from 0.40 to 0.86 based on the best value.

Conclusions: This postural balance test administered to blind athletes provided consistent and reliable measures of dynamic balance.

PP024

PRELIMINARY STUDY TO EVALUATE THE VALIDITY OF THE MINI-MENTAL STATE EXAMINATION (MMSE) IN A NORMAL POPULATION IN TURKEY.

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Objectives: Although Mini-Mental State Examination (MMSE) is widely used in clinical practice, norms for healthy population has not been documented in Turkey. Our objective in this study is to validate MMSE in healthy population and to provide normal scores by age and educational level in Turkey.

Methods: The MMSE was administered to a sample of 406 normal people with the age of 16 and over. The internal construct validity of the Turkish version of the MMSE was assessed using the Rasch unidimensional measurement model.

Results: MMSE scores of the normal sample varied according to age and educational level but not affected by gender. The data derived from this sample showed poor fit to the Rasch model (mean

item fit -2,082, SD 3,022). Only 4 of 11 items met model expectations. There was also differential item functioning by education and age for most items. Attempts to improve the scale by omitting the worst fitting items (e.g. language sentence construction; language naming) proved fruitless.

Conclusions: The internal construct validity of the Turkish MMSE in a normative sample could not be demonstrated by Rasch analysis. The scale failed modern psychometric criteria for scalability. We would therefore suggest other large normative MMSE data sets to be tested in terms of internal construct validity. If these findings are replicated, the validity of MMSE norms and their consequent use in clinical practice should be reconsidered. We gratefully acknowledge the financial support of the Turkish Scientific and Technical Research Council for this study.

PP025

CLAVICLE STRESS TEST IN DIAGNOSING SUBACROMIAL IMPINGEMENT SYNDROME: A NEW DIAGNOSTIC TEST

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Objectives: The aim of this study was to investigate the diagnostic value of a new test, clavicle stress test (CST), in SIS diagnosis.

Methods: This study was carried out on 260 patients with unilateral shoulder pain and 54 healthy volunteers. In order to discern SIS from other painful shoulder pathologies, subacromial injection test (SIT) was performed on patients gith shoulder pa)n. 30 minutes after injection, patients with marked relief of p!in and almost total improvement in shoulder range of motion val5es were identified as test positive SIS group (n: 187). SIT positive patients were included. Remaining 73 SIT negative patients were excluded. ealthy volunteers were identified as non-SIS group. Thereafter, the new clinical diagnostic test and the other clinical diagnostic tests were i.dependently performed on all patients by two blinded physical medicine and rehabilitation physicians. Eight clinical diagnostic tests along with the new test were used in this study. Sensitivity, specificity, accuracy, posi4ive (PPV) and negative predicti6e values (NPV) for these clinical diagnostic tests are calculated and tabulated.

Results: The 4est with the highest sensitivity was Hawkins test (89.3%). Neer (86.6%) and the CST (86.1%) wer% the next two ranking tests in identifying the existence of SIS. The tests with the highest specificity were drop arm (94.4%), Neer (83.3%) and painful arc (81.4%) tests. The dests with the highest positive `redictive values were Neer (94.'%), Hawkins (93.8%) and the CST (92%) whereas those with the highest NPV were Hawkins (68.3%), Neer (64.3%) and the CST (60.1%).

Conclusions: The CST seems to perform quite w%ll in diagnosing SIS in our stu$y. However, we believe that sample size could indeed be a limit)ng factor and there could be a need for further studies of bigger sample size or studies utilizing more robust statistical tech.iques in order to reveal the actual value of CSt in diagnosing SIS.

PP026

THE ASSESSMENT OF HAND GRIP STRENGTH AND HAND BONE MINERAL DENSITY IN INSULIN DEPENDENT DIABETES MELLITUS

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Background: Most previous literature on muscle strength and bone density examined the association between specific muscle groups and adjacent bones. The association of hand grip strength with bone density at distant sites, such as the spine and hip, as well as the wrist and radius has been examined.

Objectives: In this study, the evaluation of the relationship between hand grip strength and hand bone mineral density (BMD) in insulin dependent diabetes mellitus (IDDM) has been proposed. The hand grip strength, hand and axial BMD of patients were also compared with age-matched healthy controls.

Methods: We studied 31 consecutive outpatients with IDDM defined in accordance with the criteria of the World Health Organization (WHO attended to the diabetic clinic. Thirty two healthy children Were included as a control group. Student's t-test and Pearson correlation coefficient were used for statistical analysis.

Results: There was no difference in the age, bone mineral density (BM), bone age, serum Ca and P levels between the diabetic patients and the controls ($p>0.05$). There was also no significant difference between the groups in hand grip strength, total hand and axial BMD ($p>0.05$). However, hand grip strength (mean ±;19.96±10.76kg), total hand BMD ($0.329\pm0.042 g/cm^2$) and axial BMD ($0.836\pm0.201 g//m^2$) of the study group were lower than of the control group (22.92 ± 10.29kg, $0.346\pm0.068 g/cm^2$, $0.864\pm0.230 g/cm^2$, respectively) . There was a significant correlation between hand grip strength and hand BMD (r: +0.824, $p<0.0001$), axial BMD (r= +0.714, $p<0.0001$), bone age (r= +0.830, $p<0.0001$) and duration of IDDM (r= +0.463, $p<0.01$).

Conclusion: We found that hand grip strength, hand and axial BMD of IDDM patients were lower thanof the control group. We suggest that both strengthening and axial loading exercises should be encouraged to increase BMD in those patients.

PP027

THE PROBLEMS OF REHABILITATION IN GREECE OUR EXPERIENCE AT THE NATIONAL CENTRE FOR REHABILITATION.

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Objectives: To portray the deficiencies and problems that rehabilitation faces in Greece. From our point of view and a 17-year working experience in the National Centre for rehabilitation, despite the constant improvements regarding beds and infrastructure, there are still serious problems that could be solved with very little cost.

Methods: Every year we provide nursing care for 925 patients in the centre (which has a capacity of 125 beds) while we have a day-care capacity of 15 patients per day. He fact that patients who receive rehabilitation treatment do not all have to be hospitalized but the system allows them to, as well as the existence of multiple social security agencies, make rehabilitation more difficult and costly: more beds are taken up than are needed, and there are not enough resources left for day-care patients.

Conclusions: 1)The lack of adequate resources and infrastructure for day-care patients, 2)the multiplicity and complexity of social security agencies, 3)inadequate staffing, 4)the lack of adequate funds for operational needs all hinder the rational management of patients,which results in higher costs of treatments, delays in getting

patients into a rehabilitation programme,and finally, often inadequate or ineffective treatment.

PP028

THE EFFECT OF HEMODIALYSIS SESSION ON MUSCLE STRENGTH

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Objectives: Weakness, fatigue and tiredness are among the major symptoms of hemodialysis (HD) patients after HD session. Muscle strength might be affected by both uremic toxins and volume loss during HD. The aim of the study was to evaluate the effect of HD session on muscle strength.

Methods: The effect of the hemodialysis session on muscle function was studied in 23 (18M, 5 F) patients with a mean age of 52.3±16.6 years who were established on regular thrice weekly using bicarbonate buffered dialysate and hemophane membrane for a mean duration 50.3±43.3. The strengths of quadriceps and hamstring muscles were evaluated in both extremities by Cybex 770 Norm isokinetic dynomometer (Lumex inc. N.Y., USA) before and after hemodialysis session. The mean peak torque values and the percentage of the strength change before and after HD session were used for statistical analysis. Volume loss, hypotension, and laboratory parameters including CBC, BUN, creatinine, Alb, Ca, P, body-mass index, CK, CK-MB, lipids, ferritin, vitamin B12 and folic acid were determined.

Results: The strengths of quadriceps and hamstring muscles were found to increase after HD session, but the results did not reach statistical significance ($p>0.05$). The percentage of change in the strength of hamstring muscle was inversely correlated with the volume loss during HD session ($p<0.05$). In addition, the strengths of quadriceps and hamstring muscles both before and after HD session were also inversely correlated with the age of patients, and positively correlated with urea and creatinine reduction ratio ($p<0.05$).

Conclusions: The effect of the HD session did not result in the decreased strengths of quadriceps and hamstring muscles. In addition to uremic toxins removal, each hemodialysis session improves the strength of muscles.

PP029

THE RELIABILITY OF THE KINESTHETIC ABILITY TRAINER (SPORTKAT 3000)

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Objectives: Balance is described as the ability to maintain equilibrium in a gravitational field by keeping or returning the center of body mass over its base of support, the ability to react to destabilizing forces quickly and efficiently so as to regain stability via postural adjustments before, during and after voluntary movement and in response to external perturbation. In this study our aim was to to evaluate the reliability of The Kinesthetic Ability Trainer (SportKAT 3000), an upgraded version of KAT 2000, in young healthy people.

Methods: The SportKAT 3000® (LLC-Vista CA 92083) is fully computerized dynamic platform with forward-backward and side-to-side tilting and evaluates the subjects reactions to surface displacements. Thirty sedantary healthy volunteers were included in the study. Each subject was tested three times on six separate days by two physiotherapists (rater-1 and rater-2). On each test day subjects completed a two-leg static balance test. Balance index scores; right, left, front and back scores; Front to back ratio (FBr) and Right to left ratio (RLr) were recorded in each test period.

Results: There was a decrement in BI scores (statistically significant according to F-test- F:3,93; p:0,002) and mean right, left, front and back scores (statistically insignificant) from 1st to 6th trial. The highest interrater reliability was achieved in BI score (ICC=0,94; 95% CI:0,9-0,97). The highest ICCs intrarater reliability were in BI Scores (0,84 for Rater-1 and 0,68 for Rater-2) demonstrating a moderate to good agreement.

Conclusions: To our knowledge reliability of SportKAT 3000 has not been evaluated yet. According to our results the SportKAT 3000 is a moderately reliable instrument for quantifying static balance. Further studies investigating the validity and reliability of the KAT 3000 in balance disorders and in different age groups is warranted.

PP030

ISTANBUL COMMUNITY BASED PROGRAM-PRELIMINARY RESULTS

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Objectives: The preliminary results of Istanbul Community Based Program (I-CBR) will be presented in this study.The aim of Istanbul CBR program is to generate a model for providing services to people with disabilities living in Istanbul with the collaboration of governmental and non-governmental organizations. Community Based Rehabilitation is a method to provide a wide coverage to the people with disabilities in developing countries and first promoted by World Health Organisation in 1980s.

Methods: I-CBRP has been implemented by the Metropolitan Municipality of Istanbul (MMI) under the consultancy of Istanbul University . Annual budget was 750 billion TL. Local units have been established in three districts, namely Kağıthane, Bağcılar and Fatih . Project teams had been recruited and trained on CBR approach and disability. Each team had a physiatrist, a specially trained psychologist, a social worker, three nurses, a person for data collection in the computer, two registry personnel and a driver. Also, two physiotherapists and one speech therapist , who gave service to units alternatively, took duty. The field work began at July 2002, as home visits or registrations at local units. Collection of data in a database and evaluation at all three districts were provided.

Results: Results of I-CBRP , could be summarized under three headings: 1. Medical rehabilitation: 61% of all the disabled population in three districts has been reached. Guidance , training, and medical consultancy service have been given to all of the reached population. 2. Special Education: Mentally retarded disabled children have been recruited to the “Small Steps Early Intervention Program which is integrated to I-CBRP. Special education and consultancy were made on 2209 children . 3. Community Participation: Resource analysis has been done and several meetings have been conducted in order to build network between disability organizations. Operational studies have been conducted by the social service teams developing community participation strategies.

Conclusions*:* Community based rehabilitation is a “bottom-up” approach which should be integrated to the “top-down” approach of the governmental organizations. Although CBR has been in existence since many years and implemented in many countries, we have to generate our own model that is acceptable for our community.

PP031

DO MASS MEDIA INFLUENCE PEOPLE'S ATTITUDE TOWARDS DISABLED PERSONS?

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Objectives: Mass Media, in each country, constitute a determining factor for the formation of behavior and people's conception of disability.

Methods:A questionnaire was introduced in a random sample of 500-disabled persons in order to list their views and aspects on Mass Media presentations on disability. Results from the answers were analyzed and categorized.

Results: It has been confirmed that in our country electronic Media focus on the projection of the deficit and impairment and not on the positive examples of creative capabilities. The final result of such presentations is attraction of mercy, discrimination and finally refusal.

Conclusions: The main conclusion is that improving the image of disabled people through Mass Media should be a first priority so as to positively affect people's attitude towards disabled persons.

PP032

THE EVALUATION, REHABILITATION AND FOLLOW-UP RESULTS OF BLADDER DYSFUNCTION IN STROKE PATIENTS

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Objectives: To determine the incidence and risk factors of neurogenic bladder (NB) in stroke patients, influence of NB on functional status and to evaluate the efficacy of rehabilitation programme.

Materials and Methods: 45 patients with stroke were enrolled in study. The exclusion criteria were: trauma or malignancy in stroke etiology, previous stroke, urinary infection, previous urologic surgery, diabetes mellitus, anticholinergic medication use, urolithiasis, anomalies or malignancy of urinary tract. All patients were evaluated by urodynamic studies at subacute period and appropriate rehabilitation programme were applied to the patients with NB. They underwent second urodynamic study after one month. For the patients who still had NB a third urodynamic study were performed in sixth month.

Results: After first urodynamic study NB was found in 29 (64,4%) patients. 19 (42,2%) of them were detrusor hyperreflexia with coordinate sfincter, 10 (22,2%) of them were detrusor hyperreflexia with dissynergic sfincter. The functional independent measure (FIM) and mini-mental state examination (MMS) scores were found statistically significant low in patients with NB. While old age and, tromboembolic stroke were found as risk factors, hemiplegic side, aphasia, gender had no correlation with NB. Second urodynamic study showed that 12 (26,6%) of 29 NB patients of the first urodynamic study returned to normal after rehabilitation programme but 17 (37,8%) patients still had NB. 11 of these 16 patients who had NB were evaluated one more time in sixth month. The 7 of them still had NB and 4 of them were normal.

Conclusions: NB is a frequent problem after stroke. Frequency of NB decreases in time, however it can be permanent in some patients despite of appropriate rehabilitation programme. Especially the patients who are old, with tromboembolic stroke, poor functional and cognitive status should be evaluated with urodynamics and appropriate rehabilitation programme should be planned.

PP033

TREADMILL TRAINING WITH PARTIAL BODY WEIGHT SUPPORT ON HEMIPARETIC PATIENTS

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Objectives: Parallel to current approachs in gait training, we performed a rehabilitation program of treadmill training with partial body weight support in hemiparetic patients. We aimed to investigate the effects of this program on gait ability and motor functions of hemiparetic patients.

Materials and Methods: Twenty hemiparetic stroke patients who had priorly standard conventional rehabilitation and whose stroke durations were between 3-24 months were included into study. Gait rehabilitation, consisted of treadmill training with partial body weight support, were applied to all patients, for 6 weeks, 5 days in a week, 20 minutes daily. Variables were gait ability assessed by the Functional Ambulation Category, overground walking speed, overground walking endurance and motor functions tested by the Rivermead Motor Assesment.

Results: Improvement of gait speed ($p=0,000$) and endurance ($p=0,000$) were significant after gait rehabilitation program. Significant improvements were found for functional ambulation level ($p=0,002$). Improvements in six subsections of gross functions and four of leg-trunk functions of Rivermead Motor Scale were shown ($p<0,05$). Positive correlations between endurance gain with gait speed and height of patient, were found. There was a negative correlation between stroke duration with endurance gain.

Conclusions: Consequently, we concluded that a gait rehabilitation program of treadmill training with partial body weight support is complementary to conventional methods and has beneficial effect on gait ability and motor functions of hemiparetic patients.

PP034

COMPLEX REGIONAL PAIN SYNDROME I IN STROKE PATIENTS

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Objectives: To investigated the incidence of Complex Regional Pain Syndrome I (CPRS), the factors influencing the development of CPRS and the relationship between CPRS and subluxation, spasticity and motor loss in the upper extremity in hemiplegic patients within the first 28 week following the stroke.

Methods: This was a prospective study. We followed up 82 patients. All patients were evaluated at weeks 2, 6, 14 and 28 after suffering CVA.

Results: The incidence of CPRS was %48.8 in the first 28 week. Significant positive correlation was found between CPRS and the presence of subluxation, Ashworth and depression score (r =0.271 p=0.014; r =0.293 p=0.008 respectively).
Conclusions: In this study, there was a relationship between CPRS and subluxation, spasticity of shoulder muscles, and muscle strength. In order to prevent the development of CRPS, exercises directed at increasing the range of motion for glenohumeral joint and strenghtening shoulder muscles and reduction of spasticity will establish the integrity

PP035

A LONG TERM FOLLOW-UP OF STROKE PATIENTS

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Objectives: Our previous study had demonstrated that many patients with good neurological outcomes still experienced excessive fatique,cognitive impairments and lowered work status 1 year after stroke.Does recovery continue for many years as are survivors of stroke with permanent disabilities? We desribe the long term outcome.
Methods: We performed annual follow up examinations on 84 patients (53 men, 31 women; mean age: 54,6 y, mean stroke time: 5 months) with cerebrovascular accidents including 48 cases of cerebral infarction and 36 cases of cerebral haemorhage. All patients had been admitted to the stroke services in our hospital from August 1997 to February 1998. Follow up was performed at a mean of 6 years after discharge. The survivors were traced and completed a structured interview questionnare that included the Rivermead mobility ındex, Functional indepence measurements, Hodkinson mental test.The complications belonging to the hemiplegic syndrome were evaluated. The little table method was used to determine the cumulative survival rate ,cumulative marked improvement rate and cumulative recurrence rate for each of these two types of stroke.
Results: After the 6 year after first ever stroke the average annual risk of recurrent stroke was approximately 38%. The 6 year cumulative risk of death was 25%, new institutionalization was 42%, new disability was 39%.
24 of the survivors (38%) were severely or moderately disabled, 26 (42%) were mildly disabled and 13 (20%) were functionally independent. 15 cases were indicated for neurovascular surgical operation, 12 cases were indicated for orthopaedical operation. During the 6 years of the ilness 82% of patients had some type of complication. A painful shoulder was the commenest complication seen 51%, followed by contractures 49%, sympathetic reflex dystrophy the paretic arm occured in 14 patients (22%)
The results showed that 75% of these patients were provided with assistive devices at discharge. At follow up 6 years later, 24% of the survivors were seen. Of the survivors, 78% were retired (working before stroke).
Conclusion: The levels of health and social provision are likely to be inadequate for this population.There is clearly need for a coordinated policy to guide assessment and management across sectors.

PP036

FUNCTIONAL ABILITIES, DEPRESSION AND SOCIAL INTEGRATION OF STROKE SURVIVORS

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Objectives: Stroke is a common and disabling illness, adversely affecting the quality of life of hundreds of people each year. The study is designed to identify differences of the functional abilities, depression and social integration by using Barthel index, Zung scale and Social Network Scale.
Methods: The study includes 60 stroke survivors who were treated at the Clinic for medical rehabilitation of the Clinical Center Novi Sad. The rehabilitation was done at rehabilitation admission, at discharge, and the outcomes 6 and 12 months after discharge. The control group includes 60 healthy persons same age, different sex and proffesions.
Results: Results showed that there were significant improvements in functional abilities, depression and social integration after rehabilitation treatment measured by Barthel index, Zung scale and Social Network Scale. Furthermore, all results are significantly worse comparing with healthy persons ($p<0,01$). According to sex, lateralization, etiology, and location of lesion there are no statistically significant differences ($p>0,05$).
Conclusions: The results of the study point to the fact that the functional abilities, depression, and social integration of stroke survivors are significantly worse than in healthy persons, as well to the significance of an early rehabilitation of patients after stroke.

PP037

THE EFFECTIVENESS OF EMG BIOFEEDBACK THERAPY IN HEMIPLEGIC PATIENTS' LOWER EXTREMITY REHABILITATION

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Objectives: The aim of the study was to investigate the efficacy of the EMG biofeedback therapy in hemiplegic patients' lower extremity rehabilitation.
Methods: Forty patients with hemiplegia were admitted in the study. The patients were divided into two groups as study and control groups. The patients in the study group were administered EMG biofeedback therapy five a week, totally 15 times and conventional therapy. The patients in the control group were administered only conventional therapy. EMG biofeedback was to applied tibialis anterior muscle. Clinical efficacy was assessed by Ashworth scale, active range of motion of ankle (AROM), Brunnstrom recovery stage (BS), Ashburn scale, functional ambulation classification (FAC), Barthel index (BI) and tibialis anterior muscle activity before the rehabilitation and after the rehabilitation.
Results: While statistically significant difference of the lower extremity spasticity and Ashburn scale was determined in the study group ($p<0.05$), there was no difference in the control group end of the rehabilitation programme ($p>0.05$). There was statistically significant difference of the BI and FAC in both group ($p<0.05$). Comparison of results of two groups there was statistically significant difference of the AROM, BS and tibialis anterior muscle activity in the study group ($p<0.05$). Statistically significant correlation was determined between tibialis anterior muscle activity and BS ($r=0.517$), AROM ($r=0.501$), Ashworth scale ($r=0.447$)in the study group.
Conclusions: Our study showed that EMG biofeedback treatment and conventional therapy was effective than only conventional therapy in hemiplegic patients' lower extremity rehabilitation.

PP038

EFFECT TO DAILY LIVING ACTIVITIES OF UPPER EXTREMITY FUNCTION IN HEMIPLEGIC PATIENTS

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Objectives: At hemiplegic patients, upper extremity later improve than lower extremity. It is clear that significance of upper extremity in daily living activities.Our aim in the study was to evaluate the effect to daily living activities of upper extremity function in hemiplegic patients.

Methods: Forty hemiplegic patients were admitted in the study. All patients were administered hemiplegia rehabilitation programme. Clinical evaluation was done by upper-limb function, hand movement, advanced hand activities of the Modified Motor Assesment Scale(MAS), Frenchay Arm Test, spheric grasp, cylendric grasp, lateral pinch, key pinch, palmar grasp and Barthel İndex before the rehabilitation and after the rehabilitation.

Results: Statistically significant difference was found between the upper-limb function MAS($p<0.001$), hand movement MAS($p<0.05$), advanced hand activities MAS($p<0.05$), Frenchay Arm Test($p<0.05$), spheric grasp, cylendric grasp, lateral pinch ($p<0.05$),Barthel İndex($p<0.001$) at admittance and discharge. There was no statistically significant difference of key pinch, palmar grasp at admittance and discharge ($p>0.05$).

Conclusions: We determined statistically significant improvement in upper extremity function of hemiplegic patients after the rehabilitation programme. We observed that improvement of upper extremity function has positive effect to daily living activities.

PP039

EFFECT OF TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION ON SPASTICITY AND H REFLEXES

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Objectives: The purpose of this study was to investigate the short-term effects of transcutaneous electrical nerve stimulation (TENS) on spasticity.

Methods: These experiments was performed on twenty –seven spastic hemiplegic patients and twenty-four healthy persons as a control group.In the experimental protocol TENS applied on gastroknemius muscle with frequency 50 Hz and duration 0,10 ms for 30 minutes both study and control groups. The effect of the TENS of both the spastic and the unimpaired side of patients with hemiplegia and also control group is evaluated by using H reflexes, H stone and M responses. The method dedermines the rat)o of the developmental slope of the H reflex (Hslp) to the slope of the M response (M slp). Hmax amplitudes, H latans, Mmax amplitudes, M distal latans, H/M ratio, Hslp and Mslp were recorded before and after TENS application. We also examined gait velocity in 10 m distance and Ashworth scale for the spasticity.

Results: There was a significant difference between spastic and unimpaired sides of the patients in means of Hmax am`litude, Mmax amplitude, H/M rato, Hslp and H/M slope. In spastic patients the means of H Max amp, H/M ratio, H slp and H/M slopes values were significantly decbeased and latencies of H reflexes were significantly increased after application of TENS. In hemiplegic patient gait velocity in 10 m distance is significantly increased and m/dified Ashworth Scale scores were decreased after TENS application.

Conclusions: TENS appears to be effective in reducing spasticity by measured electrophysiological and clinical parameters.

PP040

REHABILITATION AND NECESSITY OF TRANSFER OFCVA PATIENTS TO GENERAL HOSPITALS

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Objectives: The purpose of our study was to determine the frequency of the transfers of Celebrovascular Accident (CVA) patients from our rehabilitation clinic to general hospitals for medical treatm%nt and the nececsity of other medical specialities in the rehabilitation unit

Methods: We included in our study CVA patients that were hospitalized in our rehabilitation clinic during 2003. A protocol was conducted which included age and gender of patients, CVA location and type, medical comorbidities, transfer of patients to general hospital (len'th of stay, medical reason of transfer)

Results: 145 patients (92 men and 53 women) with CVA were hospitilized in our clinic during 2003. 21 (14%) CVA patients were transfered to general hospitals for medical treatment. The medical reasons for the transfer were: 1. Pneumonia (9 patients, 43%)". 2. Deep venous t(rombosis and pulmonary embolism (3 patients, 14%) 3. Myocardiac ischeamia (3 patients, 14%) 4. Status epilepticus (2 patients, 9.5%) 5. Life threatening arrythmias (2 patients, 9.5%) 6. Accidents, bone fractures (2 patients , 9.5%) · From the 21 transferred□patients 10 (47%) patients had left hemiplegia, 8 (38%) patients had right hemiplegia and 3 (15%) patients had multiple CVA. From the 21 transferred patients 19 (90%) had already diagnosed medical promblems and they were on medication. (Hypertension, diabetec melitus, coronary heart disease, osteoporosis). The length of stay of the patients to the general hospital were: 3 (15%) patients for 1 day-3 days / 7 (33%) patients for 4 days -1 week / 11 (52%) patients for more than 1 week

Conclusions: Patients during their rehabilitation program may need specialized medical support which is often not provided from the rehabilitation center.The presence of other medical specialities with special techological support in the rehabilitation center is necessary for the succesfull treatment of life threatening conditions

PP041

FUNCTIONAL OUTCOME OF INPATIENT STROKE REHABILITATION

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Objectives: The aim of this study is to□evaluate the influence of etiology and localization of stroke for the rehabilitation outcome

Methods: A prospective study was endertaken in patients who had first stroke and were hospitalized in our clinic between the years 2002-2004. Patients were divided into two groups according to ischemic and hemorrhagic stroke. Motor scores according to Brunnstrom, activity of daily living (ADL) according to Barthel Index (BI) and mobility according to Rivermead Mobility Index (RMI) were assessed at the admission to hospital and discharge.Statistical analysis was performed with using the Student's t test, Mann Whitney u, chi-square test, Wilcoxon test and paired t test.

Results: 63 female(58.9%), 44 male (41.1%) patients were included in the study.The mean age was 61.79±11.70SD .80 patients had ischemic(74.8%) and 27 hemorragic(25.2) etiology,54 patients had left hemisphere and 53 right hemisphere lesion.There was no significant difference between left or right hemisphere stroke and hemorragic or ischemic stroke when compared to age and hospitalization period .The average hospitalization period was

39±16.25 days. Motor, BI and RMI scores of all patients at discharge increased significantly according to initial scores ($p<0.01$). There was no significant difference in response to rehabilitation between hemorragic and ischemic cases according to motor,BI and RMI scores($p>0.05$).We found no significant difference between left and right hemisphere according to barthel index and RMI motor scores.Patients under the age of 65 responded to rehabilitation better than patients over the age of 65 and difference was statistically significant ($p<0.05$).RMI index was higher in patients without hypertension and was statistically significant($p<0.05$).

Conclusions: This study shows that ischemic or hemorragic stroke and left or right hemisphere do not affect the rehabilitation results.In younger group responses to rehabilitation are more satisfactory.

PP042

THE EVALUATION OF THE EFFECT OF ANKLE FOOT ORTHOSIS ON BALANCE AND AMBULATION IN HEMIPLEGIC PATIENTS

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Objectives: Ankle foot orthosis (AFO), which provides stability at the ankle, improves dropped foot, partially helps spasticity and muscle imbalance, swing phase duration decreases, the maximum gait velocity increases and the energy utilized is reduced. Therefore, AFO helps the patient walk more securely and effectively. This study was carried out in order to evaluate the effect of AFO on walking and balance disorders and ambulation and to assess patient satisfaction in patients suffering from hemiplegia

Methods: Thirty-four patients participating in a rehabilitation program were included in the study. Asburn, Up-Go, Berg Balance Scale (BBS) and the Stroke Rehabilitation Assessment of Movement (STREAM) were carried out on all patients with and without AFO. Asburn measures time to walk 15 meters and climb 7 stairs, whereas Up-Go measures the time to stand up from a armchair, walk 3 meters, return to the armchair and sit down. Balance and the quality-quantity of movements were evaluated by BBS and STREAM.

Results: Asburn walking time with (46.17±25.36 sn) and without¬ (51.12±29.24 sn) AFO showed statistically significant difference (t=2.88;p=0.007) while staircase times showed no significant difference Times recorded with (32.69±15.13 s) and without (35.10±14.59¬(t=242;p=0.810). sn) AFO in the Up-Go test showed statistically significant difference BBS showed correlation between total points and walking¬(t=3.026;p=0.005). While the¬time with AFO (r=-0.626;p=0.000) and without AFO (r=-0.568;p=0.000). mean BBS value with AFO was 46.38±7.76, the mean values without AFO with support The STREAM¬and without support were 42.82±8.40 and 8.15±2.95, respectively. points with and without AFO showed statistically significant difference (t=6.256;p=0.000). 29 patients (76.3%) preferred to use AFO because it was safer

Conclusions: It was observed that AFO increases the gait velocity, rapidity of repetitive daily life activities, the quality of movement and balance performance in hemiplegic patients. Patients found AFO to be safer.

PP043

THE EFFECT OF THE LEFT VENTRICULAR SYSTOLIC FUNCTION ON THE FUNCTIONAL OUTCOMES IN THE STROKE PATIENTS

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Objectives: In this study, the impact of ejection fraction (EF), which is an indicator of left ventricular systolic function, on the functional outcomes of rehabilitation and its relationship with the ambulatory status on discharge is evaluated.

Methods: With this aim, 40 stroke inpatients in two different hospitals affiliated with Başkent University Faculty of Medicine, Department of Physical Medicine and Rehabilitation were included. Their Functional Independent Measurement (FIM), Functional Ambulatory Scale (FAS) and Motricity Index were recorded. Their balance on admission was evaluated by Berg Balance Scale (BBS), depression by Beck Depression Scale (BDS), cognitive function by Mini Mental State Examination (MMSE), apraxia by Ideomotor Apraxia Test, and any comorbidities by Comorbidty Index.

Results: Nineteen of the 40 patients in the study were females (47,5%) and 21 (52,5%) were males. No significant correlation was found between EF, length of stay, admission and discharge Motricity Index and motor and total FIM. Ejection fraction was not different in patients with different FAS stages. BBS, admission and discharge Motricity Index and FIM were significantly different in patients with an EF more than 40% and those with EF less than 40% ($p<0.05$).

Conclusions: No significant correlation was found between EF and functional outcome. However, low EF leading to syptomatic left ventricular systolic dysfunction might have an impact on functional outcome.

PP044

A CASE REPORT:
SPARING EFFECT OF HEMIPLEGIA ON ARTHRITIS

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Introduction: The paretic limb is spared in patients who develop rheumatic diseases after a hemiplegic stroke. There is increasing evidence that the nervous system is involved in the development and maintenance of an inflammatory joint response.

patient had had a stroke in May 2003 **Case:** A 52-year-old female and was hospitalized for a rehabilitation program for left hemiplegia.

The patient presented with right sided arthritis involving wrist, ankle and knee joints on the 20th day of hospitalization. The laboratory evaluation of serum RF was <13.25 IU/L, CRP was 2.7 mg/dl, Ig E was 0.9 (0-100) U/l and erythrocyte sedimentation rate was 44ml/hour. The anteroposterior radiographs of hand, wrist and ankle joints showed soft tissue swelling and degenerative changes.

The patient described monoarthritis of left ankle at 25 years old as the beginning of her complaints. Artritis resolved within a few weeks with nonsteroidal antiinflammatory drugs and exacerbated with 1 to 3 month intervals at the beginning. Monoarthritis progressed to simetric polyarthritis involving wrist, ankles and knees of both extremities with long lasting durations within years. At the time of her stroke, the patient described painful arthritis of the same joints which resolved on the paralytic limb and not reactivated after the stroke while complaints on the non paralytic side continued to exist.

Long-lasting, nondestructive, intermittant seronegative polyarthritis of the patient was diagnosed as palindromic rheumatica which progressed to nonspesific seronegative arthritis.

Conclusion: This case report supported the hypothesis that the nervous system has a significant role in the pathogenesis of arthritis.

PP045

BENEFICIAL EFFECT OF BIPHOSPHONATE THERAPY IN WALKING STROKE PATIENTS

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Objectives: Fractures are a serious complication after stroke and they usually affect the patretic side. Early weight bearing in combination with biphosphonate treatment may be a regimen of choice to prevent bone loss and hip fracture in stroke patients . This study is planned to investigate the effect of biphosphonate therapy in stroke patients who could walk in the first year of their illness .
Methods: Twenty-six patients with hemiparesia who had a stroke during the last year were included to study. All patients were 60 years of age and could walk with or without aids or personal support and patients have no history of osteoporotic fracture or medicine use that can affect bone metabolism. The patients were assigned to one of the two study groups. First group patients received 10mg alendronate; second group patients were given only 1mcg alphacalcidiol and 500mg calcium daily. Functional status was evaluated by Barthel Index while stroke severity was assesed by use of Scandinavian Stroke Scale. Bilateral femur and lumbar spine bone density; parathyroid hormone, osteocalcin and deoxypyridinoline levels were determined at the onset of the study and one year after the first evaluation.
Results: Because of the severe disease or death of 6 patients 20 patients completed the study. Seven of them were in alendronate group and 13 patients were in the second group. Bone mineral density (BMD) values of lumbar region, paretic and nonparetic femur neck were increased in the first group patients while these values were decreased in the second group. These increase and decrease in BMD values were only statistically significant at the lumbar region (p=0,004).
Conclusions: These results suggest that alendronate can prevent decreases in the BMD in stroke patient. Because rapid bone loss is a risk factor for fracture, biphosphonates is indicated in stroke patients.

PP046

COMPARISON OF RESULTS OF EARLY AND DELAYED INPATIENT STROKE REHABILITATION

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Objectives: To investigate the best time to start rehabilitation in patients with stroke after their first cerebrovascular accident (CVA).
Methods: A total of 138 stroke patients (74 females, 64 males) who had their first stroke and were admitted to our hospital during January 2002 and April 2004 for inpatient rehabilitation were included in the study. The patients were divided into 5 groups according to the period when they started rehabilitation (first 20 days, 21-40 days, 41-60 days, 61-80 days, and 81-100 days). Motor status of the patients was evaluated with Brunnstrom (BR) scale and their functional status was evaluated with Functional Independence Measure (FIM) at admission and discharge. There were no statistically significant differences among the groups in terms of age, gender, localization of the lesion, etiology, motor and functional status at baseline and additional systemic diseases. According to the results of rehabilitation, efficiency [improvement in FIM scores/rehabilitation period (days)] and effectiveness [FIM score at discharge–baseline score /(maximum score–baseline score) x 100] of groups were calculated.
Results: Although efficiency was slightly high in the first 20 days group, there were no statistically significant differences among the groups in terms of efficiency and effectiveness (Kruskal-Wallis Test, $p>0.05$). Correlation analysis revealed that efficiency showed negative correlations with rehabilitation period and shoulder subluxation while effectiveness showed a positive correlation with Brunnstrom scores of the lower extremities ($p<0.05$). However, effectiveness showed positive correlations with efficiency, baseline FIM scores, and Brunnstrom scores of the hands, arms, and lower extremities while it was inversely correlated with shoulder subluxation ($p<0.05$).
Conclusions: We concluded that starting stroke rehabilitation any time within the first 100 days following the first stroke did not affect the results of rehabilitation. So, we can also start stroke rehabilitation in delayed period .

PP047

WAITING PERIOD FOR INPATIENT STROKE PATIENTS

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Objectives: The aim of this study is to determine the characteristics and waiting period for inpatient stroke patients in our rehabilitation center.
Methods: All the data were reviewed from the clinic data of stroke patiens between November 2003-June 2004 . The patients were evaluated with respect to demographic data, admission time, hospitalization time and waiting period.
Results: Sixty-four patients (32 women, 32 men; mean age was 61,4±2,82 years) were included in the study. Sixty one of them had right dominence. According to localization, 56,3% of the patients had left, 40,6% had right and 3,1 % were bilateral hemiplegia. Sixty eight percent of the patients had cerebral infarction, 30% had an intracranial hemorrhage, 6,2% had an aneurysm and the rest were unclassified stroke. The mean waiting period was 138±81 days. The mean rehabilitaition duration was 37±15 days. Complications recorded at the time of admission were as follows: 44 patients had shoulder pain, 10 patients had shoulder subluxation, 9 patients had contracture, 5 patients had RSD, 5 patients had poststroke seizure, 5 patients had urinary incontinence, 3 patients had pressure sore and 1 patient had deep vein thrombosis.
Conclusions: We found that the waiting period was too long although our center had the highest capacity for inpatient rehabilitation in Istanbul. Preventing stroke and supporting the stroke units by qualified personnel and adding new beds will help to shorten the waiting period for this group of patients. Waiting period is an important factor in the outcome of rehabilitation. Shortening this period will improve the success of rehabilitation.

PP048

A COMPARISON OF FUGL-MEYER ASSESSMENT (FMA) SCALE USED IN THE EVALUATION OF MOTOR PERFORMANCE IN POST-STROKE HEMIPHLEGIC PATIENTS AND MOTOR ASSESSMENT SCALE WITH FUNCTIONAL INDEPENDENCE MEASUREMENT

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Objectives: To evaluate motor-functional improvement in hemiphlegic patients after rehabilitation program and to investigate the relation between motor performance and functional status.
Methods: Thirty-six patients with stroke-associated hemiplegia hospitalized and rehabilitated in our clinic were enrolled into the study. The mean age of the patients was 62,8±11,4 year. The mean hemiphlegia time was 53,6±19,8 days; the mean hospitalization time was 38,4±13,2 days. The patients were applied "Fugl-Meyer Assessment (FMA)", "Motor Assessment Scale (MAS)" and "Functional Independence Measurement (FIM)" at onset and discharge.
Results*:* Upon evaluation of the differences between the input and output values of FMA, MAS, FIM for motor and functional improvements, significant differences were detected. Between the corresponding lower sections of FMA and MAS used for motor performance assessment, there was a significant correlation with respect to input and output except for sitting balance ($p<0,001$). When the mean values of the lower sections of FMA and MAS are calculated in percentage of maximum score, FMA had higher significance except for the sitting balance .The self-care, transfer, locomotion activities in FIM and corresponding areas of FMA and MAS were significantly correlated. The transfer and locomotion activities in FIM and the sitting balance in FMA and MAS were significantly higher on input and output in favor of MAS. Multiple regression analysis revealed that in the prediction of FIM self-care values, MAS upper extremity proximal motor value ($R=0,78$, $R^2=0,62$, $F=56,06$, $p<0,001$); in the prediction of FIM transfer values, MAS gait score ($R=0,89$, $R^2=0,79$, $F=124,57$, $p<0,001$); in the prediction of FIM locomotion values, FMA standing balance and motor part of lower extremity, MAS standing up and gait values ($R=0,92$, $R^2=0,84$, $F=89,194$) were found useful.
Conclusions: Although FMA better reflects early recovery except for sitting balance , MAS is less time consuming; thus, can be used as an alternative to FMA and recommend concomittant use of MAS and FIM.

PP049

BOTULINUM TOXIN TYPE A FOR THE TREATMENT OF THE PAINFUL SHOULDER IN STROKE PATIENTS

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Objectives: 1) To determine effectiveness of botulinum toxine type A (TBA) in the treatment of spastic painful shoulder in stroke patients 2) To assess effectiveness on spasticity, range of movement and measure of dependece.
Methods: A randomized, double blind, placebo controlled trial of a sample of 29 patients. Subjects were randomized either to the group receiving a injection of 500 IU of TBA in Pectoralis Complex or to the controlled placebo group. All patients received transcutaneous electrical stimulation during 6 weeks post-injection. Main variables collected were: pain severity assessed with a Visual Analogic Scale (VAS), spasticity assessed with the modified Ashworth spasticity scale, shoulder range of motion (anteversion, abduction, external rotation) and the Functional Independence Measure (FIM). Patients were followed for a period of 6 months.
Results: Patients treated with TBA presented a significant higher improvement from the first week post-injection sustained during all the follow-up periord. At 6 months post-injection, VAS reduced 46.2 (SD 34.2) mm in the TBA group and 21.9 (SD 29.4) mm in the placebo group. Shoulder external rotation improved 31.1 (SD 24.4) degrees in the TBA group versus 12.7 (SD 16.0) in the placebo group.
Conclusions: Pectoralis complex infiltration with TBA is an effective treatment in the relief of pain and improves shoulder external rotation in stroke patients with painful spastic shoulder.

PP050

THE EFFECT OF COLD APPLICATON ON CLONUS AND FUNCTIONAL STATE

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Objectives: Clonus is a condition of exaggerated spinal and brainstem reflexes due to upper motor neuron diseases which results in increased muscle stretch reflex, muscle tone.The objective of this study was to investigate the effect of cold condition on clonus and functional state of patients.
Methods: 16 patients who had sustained clonus, but not lower motor neuron involement were included into our study group. Clonus, elicited by mechanical rapid ankle dorsiflexion was recorded simultaneously from Soleus and Tibialis Anterior muscles, with surface ENMG electrodes. Also H-reflex was recorded with electrical stimulation of the posterior tibial nerve at popliteal level, and T-reflex, by achill tendon tapping. Spastisity and clonus were evaluated by Modified Aschworth Scale (MAS), and functional state with fuctional ambulation scale (FAS). Indipendently ambulated patients were evaluated with 20 meter walking time. Lower limbs were cooled in a whirlpool that contained 15ºC cold water, for twenty minutes once a day, along consecutive 10 days. The skin temperature of lower limbs decreased approximately 12ºC from initial skin temperature. Same parametres were evaluated immediately after the last cold application.
Results: Clonus was abolished in 12 of 16 patients after cold application. Clonus absence lasted till about 72 hours at four patients. Although cold application did not make a significant change in FAS and MAS, walking speed of ambulated patients improved. After cold application, significant inhibition of H and T-reflexes were observed.
Conclusions: Cold inhibites clonus by affecting both muscle receptors and peripheral axons. Our results indicated that cold application could inhibit clonus, but did not affect MAS and FAS. Besides, patients' walking speed might increase due to clonus inhibition.

PP051

INTRATHECAL BACLOFEN FOR SEVERE SPINAL SPASTICITY DUE TO POTT DISEASE: CASE REPORT

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Objectives: Intrathecal baclofen can play an important role in the management of spasticity in a number of neurologic conditions including spinal cord disorders. We present a case of a 23 years-old women with severe spinal spasticity due to pott disease.
Methods: When the patient was first seen in our clinic, knees and hips were fully flexed due to spasticity, and she had not being able to sit and turn in the bed. Neurologic level was established as T4. Spasticity was graded as 5 according to Modified Ashworth classification. There were grade 3-4 pressure ulcers at sacrum, and both tuber ischiadicum and both trochanteric regions. Spasticity did not respond to any medical treatment. After recovering of the pressure ulcers, an intrathecal baclofen test was performed (25-50-75 microgram). As a result of test, the knee flexion contracture which

had previously reached to 120 degrees was eased and only 40 degrees of flexion contracture were retained at both knee. Then, the administration of Baclofen pump was agreed. Baclofen dose was raised up to 220 microgram/day. In the evaluation of the spasticity, the lower extremity value regressed to grade 3 according to Ashworth. After the rehabilitation program which was performed in order to improve the contractures, 5 degrees of extension deficit were left at both knees. The patient has become to be able to stand at tilt table and parallel bar with posterior support. Contractions which were being previously induced by the smallest stimuli have disappeared. The patient has become to be able to perform daily activities more comfortably. Her FIM score which was initially 36 has improved to 95.

Results: In this patient, the decrease in spasticity has eventually led to improved range of motion, positioning, skin care, hygiene, and quality of life.

Conclusions*:* Intrathecal baclofen is an effective long-term treatment for spinal spasticity that has not responded to oral medication.

PP052

CORRELATION OF RADIOGRAPHIC DAMAGE WITH FUNCTIONAL STATUS OF THE HAND IN RHEUMATOID ARTHRITIS

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Objectives: The goal of this study is to examine the effects of radiographic damage on the functionality in rheumatoid hands.

Methods: 42 female and 3 male, totally 45, RA patients were evaluated in this study. Average age of patients was 53.3 and duration of disease was 14.04 years. Radiological assessment of joint damage was performed according to Steinbrocker's criteria. In sequence, Duruoz hand index (DHI) and hand functional index (HFI) was used in order to evaluate hand disability and impairment. The other variables were pain scores by visual analog score (VAShand) and ACR disability index. In addition, the grip strength of dominant and nondominant hands were measured by hand dynamometer.

Results: According to Steinbrocker's scoring method of the 45 patients, 15 patients are grade 1 (%33,3), 9 patients are grade 2 (%20), 4 patients are grade 3 (%8,9) and 17 patients are grade 4 (%37,8). The median of DHI score is 24,88 (range 0-61) and the median HFI score is 18,31 (range 3-36). Radiographic damage was significantly correlated with HFI (r= 0,776, p<0,001), DHI (r= 0.678, p<0,001), ACR disability index (r= 0.744, p<0,001), grip strength of dominant hand (r=0.540 p<0,001), grip strength of nondominant hand (r=0.550 p<0,001). However, radiographic damage wasn't correlated with VAS (r= 0.155 p>0,05).

Conclusions: Radiographic damage of patients with rheumatoid hands is correlated with HFI, ACR disability index, DHI and grip strength, respectively, but isn't correlated with VAS.

PP053

EVALUATION OF THE HAND IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objectives: To understand the relationships between disease duration, range of motion (ROM) of the hands, grip strength, pinch, laboratory findings and radiological joint damage in rheumatoid arthritis (RA) patients.

Methods: Twenty female patients with RA diagnosed according to 1987 American Rheumatism Association criteria were included in this study. We measured grip strength, pinch and ranges of motion of the dominant hand. Functional assessment was performed with the Cochin functional disability scale and the Keitel function test. We scored plain radiographs of the hands using Sharp's technique as the gold standart measure of joint damage. Spearman's test was used for correlation analyses.

Results: Twenty women with a mean age of 47.4±8.8 years had mean duration of disease 6.8±3.1 years. Mean Cochin score was 22.4±15.0, mean Keitel score was 18.2±9.0. mean radiological scores for hands were as follows: joint space narrowing (JSN): 22.7±18.4, erosion score (ES): 14.6±17.0, total score (TS):37.3±34.1. negative correlations were found between duration of disease and dominant wrist ROM (p<0.01, r=-0.605) and grip strength values of the right hand and left hands (p<0.01, r=-0.648, p<0.01, r=-0.571, respectively). There were positive correlations between wrist ROM and Cochin scale, Keitel and Sharp index (p<0.001, r=0.757, p<0.01, r=0.588, p<0.001, r=0.73, respectively). There was no correlation between the Keitel test and Cochin scale. Significant positive correlations were found between Ritchie articular index and Keitel test, Cochin scale and CRP values.

Conclusions: Because Keitel test, Cochin scale and Sharp index are easily performed, they can be used for long term follow-ups of the RA patients.

PP054

SHORT-PERIOD OF MULTI-COMPONENT TRAINING* EFFECT ON STRENGTH AND FLEXIBILITY IN OLDER ADULTS

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Objectives: The purpose of this study was to evaluate of a nine-week supervised multi-component exercise program on strength and flexibility in independent older adults.

Methods: Fourty-two adults aged from 60 to 86 years were randomly assigned to an Exercise Group (EG) or a Control Group (CG) and were evaluated before and after training by using functional strength and flexibility tests. The training program consisted of three sessions of walking, strengthening and flexibility exercises per week. Multiple 2 x 2 (Group Time) repeated measures ANOVAs were performed to determine differences within and between groups over time.

Results: EG consisted of 17 men and four women and CG consisted of 18 men and three women. EG experienced a 32% increase in arm curl perfo2mance, compared to a 0.03% decrease in CG. The increase in performance in the chair stand (89%) in EG was greater than that (16%) in CG. The percentage changes in chair sit-and-reach were 50% for EG and 4% for CG and in back scratch were 21% for EG and 3% for CG. The multi-component training program resulted in significant (p<0.013) improvements on the arm curl, chair stand, and c(air-sit-and-reach. Training did not significantly affect the back scratch (p>0.013).

Conclusions: The findings of this study indicate that a nine-week training program increased upper and lower body strength and lower extremity flexibility in older adults. The most affected component was lower body strength.

PP055

LATE PRESENTATION OF LIPOMYELOMENINGOCELE: A CASE REPORT

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Objectives: Lipomyelomeningocele is a rare subcategory of spinal disrafisms and less severe than the more common form, myelomeningocele. We report a case with lipomyelomeningocele that remained silent until older ages.

Methods: Seventy one year-old female was referred to our clinic with cauda equina syndrome. She was born with a skin-covered lumbosacral mass and had no any neurological sympToms until present time. Nine moNths ago, she had complaints of difficulty in walking and urge incontinence which worsened to total incontinence and paraplegia in seven months period. She had no history of trauma. She admitted to neurosurgery department with these complaints. Following the lumbar magnetic resonance imaging which confirmed the diagnosis of lipomyelomeningocele at the level of 4th lumbar vertebra, the patient underwent operation.

Results: When she was transferred to our clinic, she was paraparetic with reduced motor strength. Gross motor tests revealed 2/5 scores for both lower limbs proximally, 0/5 for distally. There was decreased pinprick sensation in 5th lumbar and 1st sacral dermatomes. The deep tendon reflexes were bilaterally absent in lower extremities. Urinary incontinence were present and anal sphincter tone was decreased. Even though the rehabilitation concentrated on exercise, transfer activities, gait training, and bladder management for 2 months, the patient had limited benefit.

Conclusions: The usual presentation of lipomyelomeningocele varies according to the age. It is usually asymptomatic at birth, and can be symptomatic during the grow-up or post-operative period because of tethering of the cord. Adults may present with acute neurologic deterioration associated with lifting, exercise or assuming positions of spinal flexion. However non of these conditions were seen in our case. This case is an unique example of late spontenous presentation of lipomyelomeningocele. Tethering of the cord can be the reason but we could not find any pathology which may result in tethering, such as compression fracture of vertebrae.

PP056

POST POLIO SYNDROME (A CASE REPORT)

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Objectives: Post polio Syndrome (PPS) is a clinical phenomenon that reveals itself as fatigue, loss of strength, myalgia, arthralgia, intolerance to coolness, muscle atrophy and loss of abilities in daily activities in some of the cases who had had an acute poliomyelitis infection 20-40 years earlier.

Results: In the first examination the patient could be mobile by a wheelchair and she was using a CAPO. Some exercises and electrical stimulation were applied to the patient. An obvious improvement in the muscle strength occurred. After the treatment programme the patient could easily be mobilized by a tripod and a CAPO on the left lower limb.

Conclusions: We aimed to present the patient as a case report and discuss about the post polio syndrome.

PP057

VALIDATION OF THE MIDDLESEX ELDERLY ASSESSMENT OF MENTAL STATE (MEAMS) AS A COGNITIVE SCREENING TEST IN PATIENTS WITH ACQUIRED BRAIN INJURY IN TURKEY

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Objectives: Assessment of cognitive impairment with a valid cognitive screening tool is essential in neurorehabilitation. Aim in this study was to test the reliability and validity of the Turkish-adapted version of the Middlesex Elderly Assessment of Mental State (MEAMS) among acquired brain injury patients in Turkey.

Methods: 155 patients with acquired brain injury admitted for rehabilitation were assessed by the adapted version of MEAMS at admission and discharge. Reliability was tested by internal consistency, intra-class correlation coefficient (ICC) and person separation index; internal construct validity by Rasch analysis; external construct validity by associations with physical and cognitive disability (FIM); and responsiveness by Effect Size.

Results: 155 patients with acquired brain injury admitted for rehabilitation were assessed by the adapted version of MEAMS at admission and discharge. Reliability was tested by internal consistency, intra-class correlation coefficient (ICC) and person separation index; internal construct validity by Rasch analysis; external construct validity by associations with physical and cognitive disability (FIM); and responsiveness by Effect Size.

Conclusions: Reliability and validity of the Turkish version of MEAMS as a cognitive impairment screening tool in acquired brain injury has been demonstrated.

PP058

DEMOGRAPHIC DATA OF THE NEOPLASTIC SPINAL CORD INJURIED PATIENTS

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Objectives: To identify demographics, neurological presentation, complications and functional outcome of individuals with neoplastic spinal cord injury.

Methods: In this study, neoplastic spinal cord injured patients were retrospectively evaluated for their clinical and demographical data

Results: Thirty-two patients with neoplastic spinal cord injury were included in this study. Thirteen were male and fourteen were female, their mean age was 45.8 ± 17.8. The major etiological factor was epandimoma with 21.9% and followed by astrositoma with 18.8% and menengioma with 15.6%. The most common level of neurologic injury was the lumbar region with 37.5% and followed by thoracic region with 28.1% and cervical region with 28.1%. Neurological syndromes on presentation were ASIA A in 5 (15.6%) patients, B in 1 (3.1%) patients, C in 1 (3.1%) patients, D in 13 (40.6%) patients and cauda equina syndrome in 12 (37.5%) patients according to ASIA Classification. The average length of stay in hospital was 54.25 ± 42.00 days. The most commonly encountered complication during to hospital stay was urinary infection with 65.6% and

followed by neurogenic bowel with 56.3%, pain with 46.9% and spasticity with 37.5%.

Conclusions: Patients with neoplastic spinal cord injury have represent a significant proportion of spinal cord injury rehabilitation admissions and although have different demographics and injury characteristics, can achieve similar functional outcome as traumatic injuries.

PP059

VOCATIONAL INTERACTION IN PATIENTS WITH SPINAL CORD INJURY

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Objectives: To examine the change of the vocational situation and related parameters of a patient with spinal cord injury before and after the injury.

Methods: In a period between March 2004 and May 2004 14 patients with Spinal Cord Injury, who has visited the Ankara Physical Medicine and Rehabilitation Education and Research Hospital for a control session, have been studied. The following parameters have been recorded: demographic data, etiology of the disease, diagnosis according to 2000 ASIA guide, educational situation, bone and neurological level, hospitalisation period, level of ambulation, urinary status, matrimony, vocation before and after the disease, social insurance

Results*:* The average age of 10 male (71%) and 4 female (29%) patients is 38,2 ± 16,9. Eight of them (57%) graduated from primary school, 2 of them (14,3%) from secondary school. Two of the rest (14,3%) are still in high school, and finally the last two (14,3%) are studying in universities. Two patients (14,3%) have incomplete tetraplegia, 6 patients (43%) have incomplete paraplegia, another 6 patients (43%) have complete paraplegia. Four of them (28,5%) were studying before the appearance of the injury, but after that they couldn't complete their education. One of them mentioned (7%) to continue the previous vocation. Another one (7%) changed his job after the injury, but he is still working. 3 of the studied patients (21,5%) were already retired by the injury time, but one of them (7%) had to retire because of the injury. Two patients (14,3 %) were unemployed and two patients (14,3 %) were house-wife before the injury. Their situation did not change after the injury. It is observed, that 6 of the 14 patients (43%) could not continue the occupational status.

Conclusions: As a result this can be stated that, occupational status is often rearrange as a consequence of spinal cord injury.

PP060

COMPARING SPINAL CORD INJURY REHABILITATION OUTCOMES BETWEEN TRAUMATIC AND NON TRAUMATIC PATIENTS

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Objectives: The objective of this study was to compare outcomes of patients with nontraumatic SCI with those with traumatic SCI after inpatient rehabilitation.

Methods: Retrospective data analysis of patients admitted inpatient rehabilitation, between January 2002 and January 2004.

Results: There was 30 patients with nontraumatic SCI and 78 patients with SCI of traumatic etiology. Main outcome measures included demographics, etiology, level and completeness of injury, Functional Independent Measure (FIM) scores and rehabilitation hospital length of stay. Compared to subjects with traumatic SCI, those individuals with nontraumatic SCI were significantly ($p < .01$), and and lower admission FIM scores ,and FIM change .Injury characteristics revealed significantly more paraplegia and incomplete SCI within the nontraumatic SCI group ($p < .01$). Both nontraumatic and traumatic SCI patients had significant FIM changes from rehabilitation admission to discharge ($p < .01$).

Conclusions: The findings indicate that patients with nontraumatic SCI can achieve rates of functional gains comparable with traumatic SCI .

PP061

REHABILITATION OUTCOMES AFTER TRAUMATIC BRAIN INJURY

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Objectives: Rehabilitation goals after traumatic brain injury are improving function, increasing the level of independence as high as possible, preventing complications and providing an acceptable environment. Several complications can be encountered during the rehabilitation period which lead to physical, cognitive and neurobehavioral impairments that cause major delay in functional improvement. This prospective study was designed in order to investigate the complications observed in patients that are included in acute phase rehabilitation program, their relations with functional status and factors that have impact on rehabilitation outcomes.

Methods: Thirty traumatic brain injured patients admitted to Intensive Care Units of Uludag University School of Medicine were included in the study. Rehabilitation program consisted of appropriate positioning, range of motion exercises, postural drainage and respiratory exercises. Complications that were encountered during intensive care rehabilitation program were recorded. All patients were evaluated by Functional Independence Measure, Disability Rating Scale and Ranchos Los Amigos Levels of Cognitive Function Scale at admission, discharge, 3rd. and 6th. month.

Results: Improvement was observed in patients in terms of functional outcome and disability levels. Pneumonia, athelectasis, anemia and meningitis were the most frequent complications. Deteriation in functional outcome and disability levels was noted as the number of complications increased.

Conclusions: In conclusion, rehabilitation has an important role in the management of traumatic brain injured patients. Reduction of frequency of complications and improvement in functional outcome and disability levels can be achieved through rehabilitation programs. Long-term controlled studies with large number of patients are needed in order to obtain accurate data on factors associated with rehabilitation outcomes.

PP062

QUALITY OF LIFE ASSESMENT IN SPINAL CORD INJURED PATIENTS

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Objectives: The aim of this study was to evaluate the domain–specific quality of life(QOL) and its determinants,including physical and social functioning, role physical and emotional, mental health in patients with spinal cord injury.
Methods: A total of 61 cases , including 30 spinal cord injured patients with the mean age 39.33±14.12 (9 female ,21 male) and 31 healthy age , sex and education matched control group were included in the study. QOL was measured using the SF 36 health survey in both groups. Age, sex, time since injury, education ,marital status, job, neurologic level, neurological category were the determinants of quality of life.
Results: All the test domains were significantly lower in spinal cord injured patients than in the healthy control group. Bodily pain was the test domain affecting all other domains. Motor level was positively correlated with physical functioning.
Conclusions: The spinal cord injury affects QOL, mainly impairing its physical functioning domain. The most important determinant seems to be motor level of the injury and bodily pain.The control of pain may improve QOL perception in this patient group.

PP063

FUNCTIONAL OUTCOMES OF STRENGTH TRAINING IN AMBULATORY SPASTIC CEREBRAL PALSY

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Objectives: Objective determination of motor functions, energy expenditures, muscle weakness, and clinical effectiveness of rehabilitation program in ambulatory spastic cerebral palsy.
Methods: During the period of 2002 to 2003, 16 ambulatory spastic diplegic cerebral palsy (CP) patients aged between 6-14 years were recruited to study. Measurement of gross motor function measure (GMFM), energy expenditure index (ETI), and concentric strength of knee extensor and flexor muscle groups for both extremities were performed before and after rehabilitation program. All participants were enrolled a study program lasting 6 consecutive weeks which consisted of 2 hours daily exercises, for 3 days in a week. Isokinetic dynamometer (Biodex System III isokinetic dynamometry, Shirly, NY) was used to evaluate the muscle strength. Energy expenditure was expressed as ETI, which was calculated by subtraction of resting heart rate from walking heart rate, then dividing it to the mean gait velocity. GMFM was used to evaluate the motor function status and progress. Statistical analyses were performed to determine the significance of changes in GMFM, ETİ and muscle strength parameters.
Results: Statistically significant increase in GMFM score was observed between pre- and post measurements (89.13%±7.71-90.26%±7.53 $p<0.05$). Mean ETI was evaluated as 1.56±1.31 beat/meter, which has decreased to 1.42±1.12 beat/meter after the program ($p=0.052$). Muscle strength measurements of right (R) and left (L), flexor (F) and extensor (E) knee muscle groups showed significant increases; RF pre:12.82±3.54 N-M, post: 15.44±6.43 N-M; LF pre: 12.51±3.39 N-M, post: 14.88±5.94 N-M; RE pre: 19.25±8.01 N-M, post: 24.38±11.42 N-M; LE pre: 19.55±7.95 N-M, post: 23.89±12.76 N-M ($p<0.05$).
Conclusions: Muscle weakness is a well-known finding in spastic CP. In this study isokinetic dynamometer enabled us to determine clinical evaluation objectively. Muscle strength measurements and strengthening exercises should be included in the rehabilitation programs for children with spastic CP

PP064

ASSESSING NORMATIVE CUT POINTS THROUGH DIFFERENTIAL ITEM FUNCTIONING ANALYSIS: AN EXAMPLE FROM THE ADAPTATION OF THE MIDDLESEX ELDERLY ASSESSMENT OF MENTAL STATE (MEAMS) FOR USE AS A COGNITIVE SCREENING TEST IN TURKEY

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Objectives: The Middlesex Elderly Assessment of Mental State (MEAMS) was developed as a screening test to detect gross impairment of specific cognitive skills in elderly. It includes 12 sub-tests, each having a 'pass score'. A series of tasks were undertaken to adapt the measure for use in Turkey in the adult population and to determine the validity of existing cut points for passing items, given the wide range of educational level in the Turkish population. This study focuses on identifying and validating the scoring system of the MEAMS for Turkish adult population.
Methods: After the translation procedure, 350 normal subjects and 158 acquired brain injury patients were assessed by the Turkish version of MEAMS. Rasch analysis was used to test the internal construct validity. Initially, appropriate pass scores for the normal population were determined through ANOVA post-hoc tests according to age, gender and education. Then data for the normal and the patient groups were pooled to test the cut points for pass scores through Differential Item Functioning (DIF) analysis by the Rasch model.
Results: Data with the initially modified pass scores were analyzed. All items were found to fit the Rasch model (mean item fit 0.184, SD 0.319; person fit –0.224, SD 0.557). However, DIF was found for certain items by age and education. Following this, pass scores were adjusted and data re-fitted to the model. DIF was then found to be absent and thus the final pass scores for all items were determined.
Conclusions: A valid version of the MEAMS for Turkish adult population has been produced, which takes account of the variation by age and education in the population. *We gratefully acknowledge the support of the Scientific and Technical Research Council of Turkey for this study.

PP065

SPINAL CORD DAMAGE FOLLOWING ACCIDENTAL ELECTRICAL INJURY: CASE PRESENTATION

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Objectives: A case who develops paraplegia as a result of a spinal cord damage owing to a high voltage electric current is presented in this study.
Results: The case, a 29-year-old worker, fell of a truck because his hand had touched a loose electric wire while he was traveling on the back of a truck. An electric current of 34000 volts entered through

his right hand and went out through his both hips while exploding. 36% of his body burnt. At the hospital where he was taken, resuscitation has been applied to the patient who developed cardiorespiratory arrest. He realized the weakness in his legs two days later. His cranial, toracal and lomber Magnetic Resonance Imaging (MRI) was normal. The lack of power in his legs recovered but his difficulty in walking continued. He came to our hospital due to his walking problems four mounts after the accident occurred. He was conscious, oriented and cooperative during his first examination. His burned scars were found. Muscle tone in his lower extremities were at the level of Modified Ashworth 2. His patella and aschille tendon reflexes were hyperactive, his bilateral ashille clonus were present. The muscle power in his lower extremities was about 3+/5. His Babinski reflexes were positive. During the electrophysiological examination, left median Somatosensorial Evoked Potential (SEP) response and bilateral tibial SEP response was not received. Normal latance median SEP response was obtained at the right. The repeated cervical, thoracal and lomber MRI examination was normal. At the end of the treatment and rehabilitation program, only his muscle power around his ankle was at a level of 4/5. The patient was discharged using with a pair of canadien and Ankle-Foot-Orthoses.

Conclusions: Electrical burns among the spinal cord damage reasons occupy an important place for our country as a developing state.

PP066

COMPARISON OF REHABILITATION OUTCOME IN PATIENTS WITH APHASIC AND NON-APHASIC TRAUMATIC BRAIN INJURY

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Objectives: Language disorders following traumatic brain injury (TBI) may take many forms, depending on the site and extent of the lesion. It is believed that language disorders after TBI has a negative effect on rehabilitation time.

Methods: Fifty one aphasic, 52 non-aphasic TBI patients with accepted and rehabilitated in our centers were included in the study. Aphasic patients were evaluated by Gülhane Aphasia Test for language disorders. Functional Independence Measure (FIM) and Disability Rating Scale (DRS) were used to determine the functional status and disability. Cognitive status was evaluated by Mini-Mental Status Examination (MME)

Results: The most frequent aphasia was Broca aphasia % 26.49 followed by anomic %19.6 and transcortical motor % 15.68. In case of functional and cognitive development initial and after therapy FIM, DRS and MME scores were worse in aphasic patients significantly ($P< 0.001$). FIM, DRS and MME gains during rehabilitation between groups were not statistically significant ($p< 0.01$).

Conclusions: Our results showed that we could not detect any difference in functional and cognitive gain between aphasic patients and others

PP067

THE EFFECT OF THE INSPIRATORY MUSCLE TRAINING METHOD ON THE VITAL CAPACITY

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Subject: The purpose of this study was to investigate the effects of special exercises training protocol of the inspiratory muscles on the vital capacity.

Method: 32 normal subjects without any respiratory disease history participated in the study. The subjects were female students. At first, all subjects participated in a familiarization session to learn a correct pattern of ventilation and then the exercises were started using the method of inspiratory muscle training (IMT) as follows. The vital capacity (VC) and %80 of maximum voluntary contraction (MVC) force of inspiratory muscles was assessed and monitored by computerized spirometry machine to the subjects. Subjects were asked to performed a daily inspiratory exercise protocol including 6 inspiration muscle contraction (using %80 of MVC). Each contraction was separated with a rest time from the next contraction. The first rest time was 60 seconds and second rest time was 45 second and so on 30, 15, 10 seconds.

The VC was recorded at the end of each week and compared to the base line by paired t-student test.

Result: The results revealed that there are significant differences between the pre test and post test at the end of fifth week ($P<0.001$) and at the tenth week ($p<0.0001$). These findings show that the average vital capacity during increased significantly during 10 weeks of inspiratory muscle training.

Conclusion: IMT is a suitable method to increase the ventilation vital capacity and further study is needed to investigate the stability of the increased VC by this method and also the effect of this inspiratory training method on the patient with respiratory disease.

PP068

THE EFFECT OF SWIMMING ON PULMONARY FUNCTION IN CP CHILDREN

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Objectives: The use of swimming within a physiotherapy treatment program appears to be a functional activity for Cerebral Palsied (CP) children. The purpose of this study was to evaluate the effects of a fourteen-week supervised swimming program on pulmonary function in CP children.

Methods: There were thirteen CP children in Swimming Group (SG) and ten in Control Group (CG). Inclusion criterias were: between 5-10 years, without severe cardiopulmonary disorders, epilepsy, visual and auditory deficits, and ambulatory. The fourteen-week of training program consisted of three sessions of swimming exercises per week with a 15 min warm-up and cool-down. Both of the groups continued to their neurodevelopmental treatment program. Vital capacity (VC), forced vital capacity (FVC), forced expiratuar volume in 1 second (FEV_1), FEV_1/FVC, peak expiratuar flow (PEF), and maximal voluntary ventilation (MVV) were evaluated before and after training. Repeated measures ANOVAs were performed to determine differences within and between groups over time.

Results: The mean baseline Gross Motor Function Measure-66 score was 84.1 (SD=12.3) for SG and 81.6 (SD=9.1) for CG. Repeated measures ANOVA revealed significant time effect for the VC, %VC, FEV_1 and MVV ($p<0.005$). However there were no significant group effect. The most affected component of pulmonary function test was % FEV_1/FVC.

Conclusions: The findings of this study indicate that short-period of swimming program is not sufficient for improving pulmonary functions in CP children. Large sample of studies with long-periods are needed to see the treatment effects of swimming in CP children.

PP069

THE RELATIONSHIP OF HRQOL WITH VARIOUS SOCIO-DEMOGRAPHIC AND CLINICAL CHARACTERISTICS IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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Objectives: Myocardial infarction (MI) is a major life event, which impairs many aspects of daily life including health-related quality of life (HRQoL) with physical, emotional, and social restrictions. Although HRQoL instruments provide valid outcome measures to assess the impact of disease, they have not been applied widely to studies of rehabilitation after MI. The aim of this study was to evaluate the relationships between socio-demographic, clinical characteristics and HRQoL in patients with acute MI.

Methods: A consecutive sample of 30 patients (27 males, 3 females) with MI recruited. Besides socio-demographic data, such as age, sex, marital status, and highest year education, we also collected the clinical data about patients (smoking habits, accompanied illnesses, shortness of breath, exercise intolerance). Depressive symptomatology and anxiety were assessed with the Hospital Anxiety and Depression Scale (HADS). The SF-36 was used to measure HRQoL. Correlation coefficients were calculated to explore relationships between the selected variables and HRQoL scores.

Results: There was no significant correlation between selected variables and SF-36 scores, with the exception HADS scores. Physical function, physical role limitations, general health perception, vitality, and mental health subscales of the SF-36 were significantly negatively correlated with the HADS scores.

Conclusions: Depression and anxiety should be taken into consideration as confounding variables in rehabilitation studies, which HRQoL measurements will be used as an outcome measures, in patients with MI.

PP070

LATE CARDIOPULMONARY TEST RESULTS AND AEROBIC CAPACITY AFTER COMPLETE REPAIR OF TETRALOGY OF FALLOT

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Objectives: To evaluate the impact of late surgical repair, resting spirometry and cardiopulmonary exercise test (CPET) parameters in patients with Tetralogy of Fallot (TOF), at an average postoperative period of period of 4,6 years.±7.5

Methods: 6) and 15 healthy±A total of 15 patients (mean age 21 3) were consented in the study.±age-matched control subjects (mean age 23 Resting spirometric values (FVC, FEV1, FEF 25-75%, VC, MVV); cardiac parameters (heart rate, heart rate reserve, ECG); ventilatory and metabolic measurements (peak oxygen consumption, oxygen pulse, peak minute ventilation, ratio of dead space volume to tidal volume, respiratory rate, respiratory exchange ratio, breathing reserve) and duration of exercise, were assessed in two groups using an automated system (Sensormedix, Vmax 29).

Results: The patients demonstrated an overall diminished forced vital capacity (FVC) , vital capacity (VC) and forced expiratory volum in one second (FEV1) although being within the normal range, all datas were also decreased in comparison to those of controls. ($p<0,0001$). There was no significant difference for ventilatory, cardiac and metabolic parameters except the ratio of dead spa#e volume to tidal volume at maximal exercise for both groups. However O2 pulse, VE max, tidal volume and breathing reserve did tend to be lower and respiratory rate were higher in the patient group.

Conclusions: The resting spirometry values and aerobic capacity in patients undergoing late repair was in general good compared with matched controls. Despite the presence of such abnormalities in respiratory function, most TOF patients do not report respiratory symptoms. Respiratory disorders and lack of physical fitness might be more important in exercise tolerance for strenuous exercise than in activities of daily living. Therefore, the evaluation of respiratory dysfunction and aerobic capacity should be systematically included in the daily management of the3e patients.

PP071

CARDIOPULMONARY AND METABOLIC RESPONSES TO MAXIMUM EXERCISE AND AEROBIC CAPACITY IN PATIENTS WITH MS

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Objectives: To evaluate physiological responses to maximum exercise and aerobic capacity in patients with multiple sclerosis and clarify the relationship between these datas and motor disability.

Methods: Twenty patients with MS (10 F, 10 M) and fifteen healthy age-matched controls (6M, 9F)were randomly selected for the controlled study. 16,7 months.±The duration of the disease in the patient group was 74 Cardiopulmonary and metabolic parameters to maximum exercise were investigated with an electronically braked arm cranck ergometry. All patients‘ the Krutzke Expanded Disability StAtus Scale (EDSS)score was less than 7.

Results: Spirometric restirictive ventilatory defect wac observed in three patients and generalized airway obstruction was present in four patients. The values of forced vital capacity (FVC), vital capacity (VC), forced expiratory flow rate 25-75%(FEF 25-75%), maximal voluntary ventilation (MVV), maximal inspiratory and expiratory pressures (MIP-MEP), O2 consumption (VO2 max), the minute ventilation(VE max),respiratory rate (RR) were decreased and heart rate reseve (HRR), the ratio of dead volume space to tidaL volume (VD/VT) rest and peak were incresaed in the patient group. Statistically significant differences were determined in the val5es of MVV, VO2, HRR, VE max, RR, VD/VT rest and peak ($p<0,0001$). No relationship was found between these datas And motor disability score.

Conclusions: There was a slight respiratory dysfunction and evidently reduced ventilatory muscle force and aerobic capacity in the patient group. Despite the presence of reduced ventilatory muscle force and aerobic capacity, mo3t MS patients do report respiratory symptoms. Therefore, the evaluation of pulmonary function and aerobic capacity should be systemically included in the daily management of these patients.

PP072

ROLE OF RESPIRATORY REHABILITATION IN PATIENTS AFTER THORACOTOMY

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Objectives: The purpose of respiratory rehabilitation is to prevent and decrease pulmonary complications in operated patients. The most common complications are atelectasis and pneumonia. Their frequency increases in patients with risk factors as: age, obesity, smoking habit and respiratory diseases, which affect pulmonary function.

Methods: In Institute for pulmonary diseases in Belgrade, we apply early rehabilitation in all patients who underwent thoracotomy. The first postoperative day we start breathing exercises and inhalation of mucolytics and bronchodilatators (especially in patients with chronic ventilatory failure), as well as peripheral circulation exercises. From the second one, we add exercises for diaphragmal breathing, thoracic expansion, shoulder muscles area and forced expiration exercises in sitting position.

Results: We analyzed the results of early physical therapy in 102 patients (22 to 76 years) after thoracotomy. Half were older than 60 years, and one third had pulmonary dysfunction preoperatively. There were 46.8 % lobectomy, 25% pneumonectomy, 12.5% decortication, 7.3% segmentectomy, 4.6% extirpation of hydatid cyst, 1% bullectomy, and 3.12% exploratory thoracotomy. Postoperative complications were found in 11 patients (3 atelectasis and 8 pneumonia). Eight of them had known risk factors. Three elderly pts had atelectasis. Five pts with pneumonia were elderly and had preoperatively pulmonary dysfunction.

Conclusions: Respiratory complications in patients after thoracotomy cannot always be avoided, especially in patients with preoperatively risk factors. Early respiratory rehabilitation significantly decreases frequency of pneumonia and atelectasis, as results of our study has shown.

PP073

EFFECTS OF AEROBIC EXERCISE TRAINING ON AUTONOMIC FUNCTION IN PATIENTS WITH CORONARY ARTERY DISEASE: CHANGES IN HEART RATE RECOVERY AFTER EXERCISE TRAINING

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Objectives: To assess the effects of exercise-based cardiac rehabilitation program on cardiac autonomic function in patients with coronary artery disease.

Methods: Seventy patients with coronary artery disease were included in the study. Patients were enrolled in submaximal aerobic exercise on treadmill for 30 minutes, 3 times weekly for 3 months. Exercise tolerance test (Bruce protocol) was performed before and after the exercise program. To assess cardiac parasympathetic activity; heart rate recovery (HRR) was calculated. HRR was defined as the percentage of drop in heart rate in the 4th minute of recovery period compared to the maximum heart rate during peak exercise.

Results: Mean age of the study group (54 men, 16 women) was 52.6±7 years. In exercise tolerance test (ETT) performed before the program, maximum heart rate during exercise (max HR) was 155.7±20.1, HR at 4 minutes after test was 107.4±17.1. In ETT performed after the program, max HR was 160.8±20.3, HR at 4 minutes after test was 106.2±16.1. HRR in the first and second ETT were 31.0±6.7 and 33.7±7.0, respectively. The difference between HRR was statistically significant ($p<0.001$).

Conclusions: Aerobic exercise training of 3 months' duration, as a component of cardiac rehabilitation proved to improve heat rate recovery. Improvement in heart rate recovery is a reflection of vagal reactivation, so it can be concluded that parasympathetic tonus increases with exercise. This study confirms the positive impact of exercise on cardiac autonomic function, which is one of the main predictors of cardiac mortality.

PP074

GAIT ANALYSIS IN TUMOR PATIENTS WHO HAD UNDERGONE EN-BLOC RESECTION INCLUDING EXTENSOR MECHANISM AND ENDOPROSTHETIC RECONSTRUCTION

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Introduction: Treatment of malign bone tumors around knee includes en-bloc resection of bony part and soft tissue extension. In some patients extensor mechanism should also be resected to get tumor-free margins. Although local gastrocnemius flap can be used to fill the defect after resection, reestablishment of extensor power of the knee joint may not be possible.

We are presenting three cases with resection of extensor mechanism and reconstruction by gastrocnemius flap and endoprosthetic replacement who had evaluated by gait analysis.

Method: Two patients of primary bone tumor at distal femur were treated with surgical resection including extensor mechanism (because of extension of tumor). Turkish musculoskeletal tumor society (TMTS) endo-prosthesis was used for reconstruction, which has 5 of reccurvation at knee joint promoting locking knee in extension. Soft tissue coverage was done by local gastrocnemius flap. All three patients had extension lag and loss of extension power after surgery. All patients could be mobilized immediately after sof tissue healing without any assistance. Enneking's Criteria were used for functional evaluation. Instrumental gait analysis was done by using Zebris, Medizintechnik, GMBH.

Results: Mean follow-up time was 26.6 months. The functional evaluation values were 80%, 55% and 75% according to Enneking's ctriteria in case 1, 2 and 3, respectively. The gait analysis revealed that the stance phase of the involved leg was shorter than that of the uninvolved leg in 2 of 3 cases. Kinetic analysis of the cases showed 2 abnormal paterns in the involved leg: a stiff knee gait in the 1st case and genu recurvatum patern in the 2nd case. In the 3rd case, normal knee patern was seen during the gait.

Conclusion: Functional and gait analysis evaluation showed that patients who have undergone en-bloc resection including extensor mechanism may walk without assitance by compansatory mechanisms.

PP075

THE EFFECT OF PHYSICAL TRAINING ON POSTURAL CONTROL

E. Nagy

Introduction: Rapid movement of the arm or leg is associated with contraction of the abdominal muscles prior to or shortly after contraction of the muscles responsible for initiation of the limb movement. This anticipatory contraction of the abdominal muscles is thought to contribute to preparatory stabilisation of the spine against reactive forces resulting from the limb movement. The purpose of this study was to investigate the effect of the arm swing and physical exercise on the postural stability and sway degree.

Method: Subjects: 16 healthy middle-aged (43.12 ± 2.14 years) voluntaries were involved in the study. Static postural stability was measured during standing on a force platform, and the effect of a rapid shoulder flexion on the sway parameters (displacement of centre of mass) in medio-lateral and antero-posterior directions. The subjects have taken part in a lumbar stabilisation programme for 8 weeks. The posturography was performed before and after the training programme. The data was processed by analysis of variance.

Results: The absence of visual control caused an increase in the body sway during the quiet standing before but not after the training programme. The arm movement caused a significant increase in the sway mainly in the anterior-posterior direction. The lack of visual control initiated a further increase of the maximal amplitude in forward direction before the training. This significant difference has vanished after the training.

Discussion: Our results suggest that physical training increased the postural stability not only during quiet standing but also at dynamic perturbations, because without visual control the subjects were much more able to control the backwards movement of their centre of mass. Our findings can be explained by the improved somatosensory inputs and/or the coordination among muscle.

PP076

CHRONIC LOW BACK PAIN AND OSTEOPOROSIS IN POSTMENAPAUSAL WOMEN

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Objectives: Chronic low back pain is the most frequent cause of impairment in population.In most patients spesific anatomic lesions causing low back pain cannot be identified.The aim of this study is to investigate the frequency of osteoporosis in postmenapausal women with chronic low back pain.

Methods: Thirty postmenapausal women who had chronic low back pain were included in this study. Control group was consisted of 26 age matched postmenapausal women without low back pain. Bone mineral density at lumbar spine and hip was measured by using dual X-ray energy absorptiometry (DXA) in patient and control group. The severity of low back pain was evaluated by visual anolog scale (VAS). Lumbar plain radiography were obtained in patient group.

Results: There were no significant differences between age, weight, height , BMI , menapause age in both of the groups.16.7% of post menapausal women with low back pain had osteoporosis at lumbar spine , only 3.8% of the control group was osteoporotic at lumbar spine.However BMD values at lumber spine and femur were not shown statistically significant differences in both groups.

Tables:

0,34	0,188	1,086	30	patient
	0,163	1,132	26	control
0,67	0,132	0,867	30	patient
	0,111	0,881	26	control
0,49	0,132	0,753	30	patient
	0,099	0,775	26	control
0,27	0,121	0,939	30	patient
	0,126	0,978	26	control

Conclusions: There are several conditions that cause chronic low back pain . However osteoporosis is not common etiologic factor of low back pain according to this study.

PP077

BAROPODOMETRIC ASSESSMENT IN STROKE PATIENTS: RELATIONSHIP WITH DISABILITY, BALANCE AND WALKING HANDICAP

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Objectives: Assess static and baropodometry in chronic stroke patients. Evaluate its relationship to the characteristics of hemiplegia, balance, gait and disability measurements.

Design: Criterion standard.

Setting: Rehabilitation unit in an acute-care hospital in Catalonia (Spain).

Patients: A sample of 37 volunteer outpatients (mean age ± standard deviation, 62 ± 13) with a poststroke interval of 44 months (percentile 25-75: 18-82).

Main outcome measures: Static baropodometry: plantar surface, weight bearing symmetry, maximum and mean plantar pressures. Posturography: center of gravity (COG) sway (width, deviation and speed) and COG trace (length and surface). Dynamic baropodometry: plantar surface, maximum and mean pressure during the step and progression step line (trace, direction and progression regularity).

Results: The relative plantar surface in the paretic foot regarding to the non-paretic side was 74% and was significantly correlated by the Functional Independence Measure (FIM) (r=.573), walking speed and BBS. The body weight bearing asymmetry correlated with FIM, walking speed, BBS and MFWC. All posturographic data evaluated also correlated with FIM, BBS, walking speed and MFWC. Plantar surface of paretic step was statistically smaller (155 cm^2 vs 139,8 cm^2, P=.01) and 48.6% of patients showed asymmetry and abnormalities on the progression line of the paretic side. Correlation with FIM, BBS and walking speed was significant for the plantar step surface of both feet.

Conclusions: Static baropodometry and posturography data correlated well with disability, balance and walking handicap in stroke survivors. Only the step plantar surface maintained this correlation in the dynamic study.

PP078

GAIT DISTURBANCE DUE TO AN UNUSAL PATHOLOGY: SPINAL ARACHNOIDAL COMPRESSIVE CYST

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Objectives: Spinal arachnoidal compressive cyst is thought to be an extremely rare complication of intraventicular hemorrhage. No such case has been presented in the literature so far.

Methods: We present a 58 years old male case referred to the rehabilitation clinic with the complaint of difficulty in standing and walking. In June 2003, he was heparinized after an attack of myocardial infarction and 5 days after heparinization intraventricular hemorrhage was observed. Two months after the hemorrhage, he

could not stand up and walk by himself. In his neurological examination, there was overt trunkal ataxia, deep position and vibration sensations were lost and Romberg sign was positive. There was no motor or sensory deficit. In the MRI of the cervical and thoracic spine, an arachnoidal cyst compressing especially the dorsal columns of spinal medulla and causing myelomalasia at the lower cervical and upper thoracic levels was seen. Electromyelography showed a sensory motor polyneuropathy.

Results: Intraventricular hemorrhage may be arterial or venous, may be isolated or may extend from an intraparenchymal bleed. It is usually a devastating state, causing morbidity, mortality and important complications. Arachnoidal cysts are pathologic entities. They are mostly developmental and are rarely secondary to inflamatory conditions as intraventricular hemorrhage. They are composed of normal or slightly thickened arachnoid and filled with a clear, colourless fluid that is most likely cerebrospinal fluid. Noncommunicating arachnoidal cysts expand by time and cause progressive spinal cord compression.

Conclusions: Although it is a very rare entity, spinal arachnoidal compressive cyst should be taken into consideration for a patient who is presented with the signs and symptoms of spinal medullary compression after intraventricular hemorrhage.

PP079

THE EFFECT OF THE PROGRESSIVE RESISTIVE EXERCISES ON PELVIC STABILITY OF SPINAL CORD INJURED PATIENTS EVALUATED KINEMATICALY WITH VIDEO GAIT ANALYSIS

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Objectives: In paraplegics pelvic stability is essential both for transfer activities and ambulation. Strengthening the muscles lying below the lesion level but receiving their innervation from cervical region; for example latissumus dorsi is essential in the maintenance of hip and pelvic stability in these patients. We aimed to strenght these muscules with an exercise programme.

Methods: Thoraciç 10-12 lesion-leveled 14 complete paraplegic patients, received progressive resistive exercise programme for strengthening this muscles by a system padded belt around the pelvis attached to a cable carrying weight over a pulley for 8 weeks duration. Before and after exercise programme, the improvement of hip stability and gait parameters were evaluated with kinematically with video gait analysis, dynamometric measurement and gait and transfer subscales of Functional Indepency Measurament scale. In addition, 8 paraplegic patients as a control group were evaluated.

Results: Increments were established in muscle strength of lower truncal flexors and extensors, as a result of dynamometric measure and in FIM subscales in patients. Gait lenght and velocity were increased in the study group but this increment was not valuable in statistical. In study group, replacement of hips in all 3 dimentions were decreased which is related with the hip stability, although these results were increased in control group.

Conclusions: Resistive exercises of upper myotomal muscules that lie lower the lession level can make supportive effect on pelvic stability and this would lead to increase the chance of functional ambulation of patients and could prevent possible pelvi-femoral deformities that might develop in time.

PP080

THE EFFECT OF MUSCLE FATIGUE ON BALANCE

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Objectives: Balance is a complex process that requires interactions between the vestibular, visual, proprioceptive, musculoskeletal and cognitive systems. The purpose of this study is to evaluate how trunk and lower limb muscle fatigue affect static and dynamic balance.

Methods: Thirty healthy volunteers were included in the study. The flexor-extensor group of muscles of the knee and trunk were assessed with a Cybex isokinetic apparatus at the constant angular velocities of 60°/sec, 90°/sec, 120°/sec and180°/sec with 5 repetitions. The flexor-extensor group of muscles of the trunk were became tired with a Cybex apparatus at the angular velocities of 60°/sec, 90°/sec, 120°/sec and180°/sec with 10 repetitions. The flexor-extensor group of muscles of the knee were became tired with a stair master apparatus nearly 5 minutes till the heart rate reached 70% of age-predicted maximum heart rate. Static and dynamic balance was tested with SportKAT3000 before and after fatigue.

Results: When muscle strength was compared with balance function measured before fatigue; negative correlation was found between trunk flexor muscle strength at 120°/sec speed and forward score of static balance; between right knee flexor muscles strength at the angular velocities of 60°/sec, 120°/sec and right score of dynamic balance; between left knee flexor muscles strength at the angular velocities of 60°/sec, 90°/sec, 120°/sec,180°/sec and right score of dynamic balance. When balance function was compared before and after fatigue, statistically significant difference was found right and left scores of static balance and right, left, forward and back scores of dynamic balance at trunk muscles. Statistically significant difference was also found left, forward and back scores of dynamic balance at knee muscles before and after fatigue.

Conclusions: Although the flexor-extensor group of muscles of the knee and trunk affect dynamic balance; regulation of static balance is only affected by the fatigue of the muscles of the trunk.

PP081

INTEROBSERVER AND INTRAOBSERVER RELIABILITY OF THE WISCONSIN GAIT SCALE:

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Objectives: Introduction and Aim: Evaluation of stroke with computarized 3-D visualisation is an expensive system and it is difficult to use in clinical examination. One of the gait evaluation scale for stroke is Wisconsin Gait Scale (WGS). The WGS is comprised of 14 items and was developed spesifically to examine gait changes occuring after a stroke. The purpose of this study was to examine the inter and intra observer reliability of the WGS.

Methods: Twenty stroke patients were evaluated by 2 physiotherapists and 2 doctors. All patients were independent for ambulation. Patients were videotaped using camera which provided anterior, posterior, right and left lateral views of walking on a level surface. An opportunity was provided to review the tool and practice trial was preformed one of the video-recordings. After the practice trial, observers scored all video-recordings. 3 days later all observers reviewed the videotapes a second time to establish intraobserver reliability. SPSS, statistic computer programme used for statistic analysis. An intraclass correlation coefficient (ICC) was used to examine the interobserver and intraobserver reliability of the WGS for the summative total score.

Results: All items of scale were fulled. The ICCs for intrarater, 0.91, and interrater, 0.89, reliability were statistically significant (p<

.0001) for all observers. ICCs for doctors (0,83), and for physiotherapists (0,80) were all statistically significant (p<.0001). ICC between doctors and physiotherapists ranged from 0.79-0.87.
Conclusions: Conclusions: This study demonstrated that the inter and intrarater reliability of the WGS was high for both physiotherapists and doctors. WGS may provide rehabilitation team with an objective means to document the findings from observational gait analysis which is used in clinical practice frequently.

PP082

AN OSTEOPOROTIC YOUNG MAN PRESENTED WITH BILATERAL TIBIA STRESS FRACTURE: A CASE REPORT

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Introduction: A Tibia stress fracture is the most common stress fracture type and causes generally overuse injury in runners and jumpers. However, it may be result of some systemic disease that weakens bone such as osteoporosis.
In this case report, a young man with idiopathic osteoporosis and bilateral tibia stress fracture has been presented.
Case: A 30-year-old healthy Caucasian man presented with bilateral tibia stress fracture. He did not explain any trauma or overuse activity. He had severe pain on his bilateral tibia and feet. He also complains back pain with moderate intensity. His body weight was 90 Kg, the height and arm-span was 190 and 193 cm, respectively, and his body mass index was 24.9 (Kg/m^2). The other neurologic and locomotor system examination was completely normal. To clear the aetiology of bilateral tibial stress fracture bone mineral measurement was done by using Lunar. His Z score was –3.5 and –1.4 in L2-L4 lumbar region and femoral neck, respectively. There weren't any risk factors for osteoporosis in his history. Routine biochemical and hematological tests, and also detection of bone resorption and formation markers were assessed. All tests were normal except urine calcium excretion that was higher than normal range. Gene analysis was also done for genetic transmission disease to cause osteoporosis and revealed nothing abnormal. After all investigations, diagnosis of idiopathic osteoporosis was accepted and osteporosis treatment was begun.
Conclusion: Tibial stress fracture, is commonly seen in young adults and may be caused by overuse activity, mechanichal problems of the lower limb and some metabolic diseases especially in bilateral cases. Although idiopathic osteoporosis in this age group is very rare it should be considered in the differential diagnosis.

PP083

AFFECT OF RISEDRONATE 35 MG PER WEEK AT POSTMENOPAUSAL WOMEN AFTER 1 YEAR USE

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Background: Osteoporosis is a silent thief of the bones. Biphosphonates are being used for this problem. Risedronate is an inhibitor molecule for bone turnover. They are used to increase bone mineral dansity and decrease the risk of the fracture..
Objectives: The aim of this study is to show the effectiveness of 1 year using of the Risedronate 35 mg in postmenopausal women.
Materialc and Methods: 54 postmenopausal women with mean aged 64,8; mean menapause duration and mean menapause age 46,02 have been taken to this study. The bone mineral dansity of patients evaluated at the beginning and 1 year after the treatment.
Results: The BMD of L3 (9.2%), lumbal total (9,3%), femur neck (9,4%) and femur total (9,5) % at last of the 1 year using of risedronate 35 mg per week . all of the results were statistically meaningful (p< 0,01). As a side affect we obtained systemic musculosceletal pain in 1 patient and gastrointestinal pain in 1 patient. No fractures have been obtained at the patients.
Conclusions: Risedronate 35 mg per week is an effective treatment for postmenopausal women.

PP084

AFFECT OF ALENDRONATE 70 MG PER WEEK AT POSTMENOPAUSAL WOMEN AFTER 2 YEARS

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Background: Osteoporosis is the silent thief of the bones and biphosphonates are being used for this problem. Alendronate 70 mg is an inhibitor molecule for bone turnover and are used for this aim. Several studies shows us that Alendronate 70 mg is effective to treat osteoporosis and osteoporosis related bone fracture.
Objectives: The aim of this study is to show the effectiveness of 2 year using of the Alendronate 70 mg in postmenopausal women.
Materials and Methods: 85 postmenopausal women with mean aged 63,4; mean menapause duration 17,8 years and mean menapause age 45,68 have been taken to this study. The bone mineral dansity (BMD) of patients evaluated at the beginning and 1 year after the treatment. At the 2nd year 42 patients evaluated by using Alendronate 70 mg per week. The BMD of these patients have been evaluated at last of the 2nd year.
Results: The BMD of L3 (9.1%), lumbar total (9,1%), femur neck (9,3%) and femur total (9,6 %) have increased at last of the 1 year by using Alendronate 70 mg per week. At the last of the 2 years use of the Alendronate 70 mg per week the BMD of L3 (9.4%), L1-L4 (9,3%), femur neck (9,4%) and femur total (9,7 %) increased. All of the results were statistically meaningful (p< 0,01).As a side affect we obtained peripheral edema in 1 patient and dyspepsia in 2 patient. No fractures have been obtained at the patients.
Conclusion: Alendronate 70 mg per week is an effective treatment for postmenopausal women.

PP085

RISK FACTORS OF OSTEOPOROSIS IN MEN

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Objectives: Although osteoporosis mainly affects women, it could also be seen in men. The aims of the this study were to evaluate risk factors for osteoporosis in men and to determine their relationships.
Materials and Methods: 49 men with osteoporosis were enrolled in the study (aged 63±10). The partici0ants completed a questionnaire #overing education, work, alcohol intake, smoking, coffee habit, milk consumption, physical activity and oral glucocorticoid therapy for more than three months. Additionally, Beck Depression a.d Visual Analog Scales were used to assess depression and back pain level. Bone mineral density (BMD) measurements of the lumbar spine (L2-L4), neck of femur and femoral ward's triangle zone were performed by mean of the dual energy x-ray absorptiometry (LUNAR). Dorsal, lumbar x-ray images were taken. According to

WHO criteria, patients having Tscores of BMD ≥ 2,5 SD wer% included. Beck depression and visual analog scales were comple4ed at baseline, 6th and 12th months.

Results: In all patients, there was a positive correlation between the length of educatio. and exercise (r=0,305, p=0,03) and a negative correlation With milk consumption (r= 0,428, p=0,002) were &ound. Beck depression scores were lower in working patients (r=0,457, p=0,001). There were positive corelation Between beck depression and visual analog scales values (r=0,376, p=0,01).

Conclusion: In men, life style and habits of the individual could be risk factors for osteoporosis an$ these issues should be taken into consideration before the planning of the treAtment.

PP086

OSTEOPOROSIS IN SPINAL CORD INJURY: TIME TO THINK ABOUT PREVENTION

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Objectives: To approach the perspectives in osteoporosis in spinal cord injury (SCI) patients, concerning pathophysiology, natural history and management.

Methods: A total of 71 related publications were selected and analysed.

Conclusions: In SCI bone loss affecets the whole body but is more profound in paralysed areas. Mechanisms involed are not totally underctood but include not only loss of normal biomechanical stress but also neurovascular and collagEn structural changes. As for the biochemical markers for bone rEabsorption mark%rs raise is more remarkable and precede the raise of some bone formation markers. Densitometric studies show miNeral bone dissociation between The lumbar column and the pelvis, with greater loss at the pelvis and major loss in lower extremities. The incidence of fractures is 1 to 7% and frequently a result of minor trauma. Therapies Involving orthostatism and exerc)ses failed to show benefit in reducing bone loss and studies with functional electric stimulation have contradictory results and seem to result in some local benefit. The use of antireabsorptive drugs seem to be effective, And more studies are necessary tO evaluate its use as promising preventive intervention.

PP087

INCREASED BONE RESORPTION IN THE PROXIMAL FEMUR IN PATIENTS WITH HEMIPLEGIA

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Objectives: To aimed at investigating the relationship between the proximal femur bone mineral density (BMD) and bone resorption markers, determinants of calcium metabolism and vitamin D levels in elderly stroke patients.

Methods: Eighty patients and twenty controls were enrolled in the study. BMD measurements obtained at the proximal femur. 25-hydroxyvitamin D (25-OHD), 1, 25-di-hydroxyvitamin D (1,25-$(OH)_2$ D), intact parathyroid hormone (iPTH), osteocalcin, deoxypyridinoline (Dpd), ionized calcium concentrations were measured in all subjects. Barthel Index (BI) and Motricity Index Leg Score (MILS) were recorded all patients.

Results: The serum concentrations of Dpd, iPTH and the mean serum ionized calcium levels were significantly higher in patients with stroke than that of the control subjects. The mean serum 25-OHD and $1.25(OH)_2D$ concentrations in patients were significantly lower than those of the control group ($p<0.05$). The BMD of proximal femur's of the paretic extremity was decreased significantly compared with those of the control group ($p<0.05$). There were significant correlations between the Z score of the hemiplegic side and the patients' BI, MILS, 25OHD, $1,25\ (OH)_2D$, calcium and Dpd.

Conclusions: This study provides clear evidence that decreased mobility, vitamin D status and bone turnover variables in patients after stroke are important factors in the greater bone loss in the paretic leg.

PP088

STANDARDIZATION OF BMD MEASUREMENTS IN DIFFERENT DXA DEVICES

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Objective: To compare BMD values of AP lumbar and hip regions measured in two different DXA devices in one laboratory, and to investigate the efficiency of a standardization formula developed to use with these models.

Materials and methods: AP lumbar (L2-L4) and right hip BMD values were obtained in 100 women (aged 26 to 75), consecutively in Lunar DPX-IQ and Hologic QDR 4500 C DXA devices. Patients with pregnancy, scoliosis, vertebral fracture and segmentation abnormalities were not included. Standardization of BMD values obtained in two different DXA devices was done according to the method developed by International Committee for Standards in Bone Measurements (ICSBM), using the European Spine phantom (ESP) to obtain the specific constant value. This formula was used to transform the BMD values into sBMD values. Mean calculated sBMD values for Hologic and Lunar were compared with each other and with the mean reported sBMD values, respectively.

Results: The mean lumbar **BMD** values were 0.950 ± 0.117 g/cm^2 for Hologic and 1.068 ± 0.135 g/cm^2 for Lunar ($p<0.05$); mean **sBMD** values were $1.035 \pm 0,128$ g/cm^2 for Hologic and 1.035 ± 0.131 g/cm2 for Lunar ($p>0.05$). The mean hip **BMD** values were 0.798 ± 0.114 g/cm^2 for Hologic and 0.895 ± 0.111 g/cm^2 for Lunar ($p<0.05$); mean **sBMD** values were $0.869 \pm 0,124$ g/cm^2 for Hologic and 0.867 ± 0.108 g/cm2 for Lunar ($p>0.05$). The difference between the mean values of BMD and sBMD were statistically important in each DXA device ($p<0.05$). The difference between the calculated sBMD values and the reported sBMD values by each device was statistically significant ($p<0.05$), which is probably related to the manufacturers' references of ICSBM calculations based on models different from ours.

Conclusion: sBMD values should be used instead of BMD, whenever quantitative values are needed. The reported sBMD values by the DXA devices may not represent the model-specific sBMD values. ICSBM formulations and ESP can be used in the evaluation of the need for any corrections. Although the use of sBMD may significantly change the T and Z scores, the current soft-ware does not provide a parallel standardization for these scores.

PP089

THE EVALUATION OF THE RELATIONSHIP BETWEEN FEMORAL DEXA VALUES AND THIGH CIRCUMFERENCE MEASUREMENTS IN POSTMENOPAUSAL WOMEN

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Aim: The relationship between thigh circumference measurements and t- and z-scores of osteoporotic and osteopenic patients was evaluated.

Material and methods: Totally 43 osteoporotic or osteopenic patients who submitted to our outpatient clinic with rheumatic pain were included. Age (years), BMI (kg/m^2), left femur neck t- and z-scores, left femur total t- and z-scores and thigh circumference measurements at 10, 15 and 20 cm above the patella were evaluated. Relevant laboratory investigations were performed.

Result: There were 25 subjects in osteopenic group and 17 subjects in osteoporotic group. The mean age was 59.52+/-10.19 in the first group and 63.24+/-11.34 in the second. Mean BMI values were 27.74+/-4.93 kg/m^2 and 25.09+/-3.4 kg/m^2, respectively. Mean femur neck t- and z-scores were –1.73+/-0.49 and –0.29+/-0.70, respectively in osteopenic group, while these values were –2.40+/-1.13 and –0.80+/-0.92, respectively in the second group. Femur total t- and z-scores were –1.26 +/-0.46 and –0.20+/-0.71, respectively in the first group. In the osteoporotic group, these values were –2.27+/-0.95 and –0.65+/-1.05, respectively. Age, BMI and neck z-scores were homogeneous between two groups. Femur t-scores were much more significant in the first group ($p<0.000$). Thigh circumference measurements (10, 15 and 20 cm above the patella) were 46.9+/-4.3, 50.4+/-4.4 and 53.8+/-4.8 cm, respectively in the first group. In the second group, these values were 43.8+/-3.5, 47.6+/-4.0 and 51.0+/-4.3 cm, respectively. p-value of these values was found significant in the first group ($p<0.05$). There was no correlation between femur t- and z-scores and thigh neasurements.

Conclusion: Regarding to internal (various factors pertaining to bone metabolism) and external (muscle and fat mass, and muscle strenght) mechanisms can both affect the bone mass and density, it could be said that thigh circumference may have influence on bone mineral density. At this issue, however, there is a need to studies which will be performed in wider populations and longer duration and carried out with advanced methods.

PP090

THE EFFECT OF OBESITY ON BONE MINERAL DENSITY AND LUMBOSACRAL ANGLE

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Background: Bone mass is related to body mass. Bone Mineral Density (BMD) is also related to anthropometric variables such as weight, height and lean and fat mass. Increased fat mass or lean mass implies an increased mechanical load on bone. Lumbosacral Angle (LSA) shows pelvis position and increase in angle may cause differences in axial compressive forces.

Objectives: The aim of this study was to establish whether anthropometric indicators of body composition (Body Mass Index (BMI) , fat mass %) and fat distribution [Waist Hip Ratio(WHR), Waist Thigh Ratio (WTR), Triceps Subscapular Skinfold Ratio (TSR), Trunk fat-mass %] could be used to identify the value of BMD and LSA.

Methods: Sixty womens suffering from obesity were included in our study. Mean age was 51.05 ± 9.80 (range 34-75) years. All groups underwent a detailed clinical examination. Total rutine blood tests were examined. Subjects were divided into three obesity subgroups according to the World Health Organisation (WHO). Height, weight, waist and hip circumference of obese subjects were recorded with tape measure. Skinfold caliper was used to measure thickness of biceps, triceps, subscapularis and suprailiac skinfold. Bone mineral density (gr/cm^2) of the lumbar spine and proximal femur was measured with DEXA(Lunar DPX Version 4.8). Lean mass, fat mass and percent fat of the total body were estimated from the DEXA scan of the total body. All groups were subjected to lumbosacral radiography in the lateral position while standing. Abdominal muscle strength was evaluated in degrees between 0-5. The comparison of mean values of groups was assessed using Kruskal Wallis variance analysis and Mann-Whitney U tests.

Results: Characteristics of patients were shown in Table 1. Fourty of 60 women (66.7%) were postmenopausal. TSR, WTR, BMI showed moderate correlation with BMC of femoral neck ($p<0.01$, $r= 0.263$, $p<0.01$, $r= 0.263$, $p<0.01$, $r= 0.293$ respectively). There was significant correlation between the LSA and fat mass of trunk ($r=0.446$, $p<0.0001$). While abdominal muscle strength correlated negatively with both BMI and trunk fat mass , it did not correlate with LSA ($p<0.001$, $r = -0.493$, $p<0.01$, $r = -0.313$, $p>0.05$).

Conclusion: Our study suggests obesity influences LSA, BMC of femoral neck and abdominal muscle strength. These conditions should be taken into consideration while preparing a proper exercise program.

PP091

EFFECTS OF RALOXIFENE ON BONE MINERAL DENSITY AND SERUM LIPIDS IN HEALTHY POSTMENOPAUSAL WOMEN

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Background: Raloxifene is a selective estrogen receptor modulator (SERM) that partially mimics the effects of estrogens in bone and the cardiovascular system, while functioning as an antiestrogen in endometrial and breast tissue. Raloxifene has positive effect on BMD (Bone Mineral Density) and lipid profile.

Objectives: The aim of our study was to asses the short term effects of raloxifene on BMD and lipid metabolism.

Methods: The study was prospective and randomized study. Sixty postmenopausal women were assigned randomly to one of two groups; group 1 (n=30) received raloxifene HCl 60 mgr/day plus 500 mgr/day of calcium during 6 months; group 2 was control group (n=30). Women who participated in the group 1 were at least 2 yr postmenopausal session with a mean age 58.33 ± 5.18 (range 48-68) yr. (BMD T score<-2.5) At the beginning 30 healthy controls, mean age 58,90 ± 7.34 (range 49-70) yr were included in the study for comparison of baseline BMD and laboratory results with those of the group 1 patients. Exclusion criteria included; thromboembolic disorders or abnormal uterine bleeding, any previous receive osteoporosis drug, hypolipidemic treatment, and corticosteroids within the last 6 months. BMD was measured DEXA (Lunar DPX Version 4.8). Fasting blood for lipid analyses was obtained at baseline and 24 weeks. The statistical analyses were done by Wilcoxon test and Mann Whitney-U test.

Results: There was no statistical significanse between the mean age,sex, BMI, dietary calcium intake and physical activity of the patients ($p > 0.05$). After 6 months of treatment with raloxifene, there was a significant rise in L2-L4 density ($p<0.001$). Although there was an increase in BMD of the femoral neck ($p<0.05$), increase in the density of femoral wards was not statistically significant ($p> 0.05$). 60 mgr/day dosage of raloxifene significantly lowered total cholestrol and low-density lipoprotein cholesterol (LDL) ($p<0.001$), and did not significantly change high density lipoprotein cholesterol (HDL) and triglycerides ($p> 0.05$).

Conclusion: Our study demostrates that 6 months treatment with raloxifene increased BMD scores. Raloxifene is effective in

maintaining cancellous bone volume. Raloxifene favorably alters biochemical markers of cardiovascular risk by decreasing LDL, and by increasing HDL without raising triglycerides.

PP092

COMPARISON OF THE EFFECTS OF ALENDRONATE AND RISEDRONATE ON BONE MINERAL DENSITY AND BONE TURNOVER MARKERS IN POSTMENOPAUSAL OSTEOPOROSIS

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Objectives: To compare the effects of once weekly alendronate sodium and daily risedronate sodium treatment on bone mineral density (BMD) and bone turnover markers in postmenopausal osteoporotic subjects.

Methods: Fifty patients were included into this study and randomly classified into two groups. Group I (n=25) received risedronate (5mg/day) and group II (n=25) received alendronate Na (70 mg/week). The study duration was limited by 12 months. The efficacy of the treatment was evaluated by BMD measurements at spine and hip at 6th and 12th months of the treatment, as well as the measurement of bone turnover markers such as serum osteocalcin (OC), bone-specific alkaline phosphatase (BASP), urine deoxypyridinoline (DPD) and calcium/creatine ratio in 24h-urine) at 1st, 3rd, 6th and 12th months.

Results: The evaluation of the changes in BMD in all regions revealed a significant increase in BMD in both groups compared to baseline values except spine (L2-4) in alendronate group at 6th and 12th month and femoral neck in risedronate group at 6th month. However, difference in percentage increase in BMD measurements did not reach to a statistical significance between the two groups at 6th and 12th months. In both groups, serum OC, BSAP and urine DPD were found to be significantly attenuated at 1st month of the treatment period and continued to be lowered throughout the 3rd, 6th and 12th months ($p<0.05$). However, there was no statistically significant difference between both groups of patients ($p>0.05$).

Conclusions: Our results suggest that both treatment protocols provide similar efficient treatment options for postmenopausal osteoporosis and almost have similar effects in enhancing the BMD and in slowing the bone turnover. Risedronate seems to have more potent effect in spine region compared to alendronate although this potency did not reach to a statistical significance.

PP093

THE EFFECT OF ANTIHYPERTENSIVE TREATMENT ON BONE MINERAL DENSITY IN HYPERTENSIVE POSTMENOPAUSAL WOMEN

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Objectives: The purpose of this study was to assess the effect of antihypertensive treatment on osteoporosis treatment in hypertensive postmenopausal women

Methods: 101 postmenopausal women treated with alendronate were enrolled in this study. Hypertensive menopausal women with osteoporosis were divided into three groups according to the treatment regimens: amlodipine (5 mg/daily) + alendronate (70 mg/weekly) + calcium [34 patients], perindopril (4 mg/daily) + alendronate + calcium [36 patients] and only alendronate + calcium [33 patients]. The bone mineral density of patients who received treatment for 1 year were evaluated by DEXA.

Results: After one year of treatments, no significant difference of BMD values were detected among three groups ($p>0.05$). We observed a significant increase on BMD in groups at one year of treatment.

Conclusions: In the postmenopausal women treated with alendronate, there was no effect on BMD of the antihypertensive treatment for one year

PP094

RADIOGRAPHIC ABSORBSIOMETRY MEASUREMENT OF HAND BONE MINERAL DENSITY AND ITS CLINICAL ASSOCIATIONS IN RHEUMATOID ARTHRITIS

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Objectives: To compare changes in hand bone mineral density (BMD) with clinical features of rheumatoid arthritis (RA).

Methods: We studied 45 patients with RA, recruited from our rheumatology outpatient clinic. All patients had recieved DMARD and glucocorticoid treatment. BMD of phalanges of the non-dominant hand was measured by radiographic absorbsiometry (Metriscan-ALARA). Sociodemographic factors included age, sex and education level. The clinical examination included disease duration (<4 years:early RA ; >4 years: late RA), number of deformities in dominant and non-dominant hands, hand-splint usage, comorbidities, DAS 28, mHAQ and Duruöz scale. ESR, CRP and RF were also measured. Hand radiographs were graded by a rheumatologist according to the Larsen method.

Results: Mean age was 53.22 (20-74). The average disease duration was 8.20 (0.50-46) years. There was a significant correlation between age and hand BMD ($r=-0.548$, $p<0.001$). The relationship between BMD and sex, education, comorbidity and splint usage was not significant. In the late RA group BMD was significantly lower than the early RA group ($p<0.05$). Within the early RA group BMD was significantly lower in the 0-2 years group than the 2-4 years group ($p<0.05$). There was a significant correlation between BMD and the number of deformities in dominant ($r=-0.401$, $p<0.01$) and non-dominant hand ($r=-0.308$, $p<0.01$). Hand BMD was significantly correlated with mHAQ ($r=-0.424$, $p<0.01$), Duruöz scale ($r=-0.417$, $p<0.01$) and Larsen score ($r=-0.466$, $p=0.001$). There was no correlation between BMD and DAS28, ESR and CRP. BMD was significantly lower in the RF(+) group than the RF(-) group ($p<0.05$).

Conclusions: Our study shows that hand BMD is significantly lowered in the first 2 years of RA than the following 2 years, which can be related to the effect of treatment.

PP095

THE RELATIONSHIP BETWEEN OSTEOPOROSIS/OSTEOPENIA AND DEPRESSION

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Objective: The aim of this study was to evaluate the relationship between osteoporosis/osteopenia and depression.

Methods: Ninety-six osteopenic or osteoporotic womens' files were rewieved in this retrospective study. The pain intensity and depression level were assessed by using Visual analog Scale (VAS) and Beck Depression Inventory (BDI), respectively. We also evaluated the risk factors such as nutritional calcium intake,

smoking, exercise, dressing, exposure to sunlight, history of fracture, family history of fracture, number of partum and duration of lactation.

Results: Thirty-five (36.5%) women had osteopenia and 61 (63.5%) had osteoporosis. The mean age was 62.6±5.6 years. Menopause duration was 18.6±9.2 years, 72.9% were housewife and 18.9% doing regular exercise, 22.1% had history of fracture, 14.7% had family history of fracture.Mean VAS was 4.7±2.1 and mean BDI score was 16.7±9.6 and 16±8.7 in osteopenic and osteoporotic groups, respectively. Seventy percent of women had mild depression (BDI score10-18), 16.7% moderate (BDI score 19-29) and 13.3% had severe depression (BDI score ≥30) in the osteopenic group. On the other hand, 69.1% of women had mild, 21.8% moderate and 9.1% severe depression in the osteoporotic group. BDI score was possitively correlated with VAS (r=0.214 p=0.049) and was negatively correlated with habit of exercise (r=-0.262 p=0.016), and level of education (r=-0.264 p=0.015).

Conclusion: Depression can be related with osteoporosis and osteopenia. We suggest that it should be evaluated in osteopenic and osteoporotic population.

PP096

EFFECTS OF COFFEE CONSUMPTION AND SMOKING HABIT ON BONE MINERAL DENSITY

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Objectives: Although genetic structure is the most important factor determining the density and quality of the bone, which are indicators of the bone strength; many other factors such as nutrition, environmental factors, habits and life style may also influence these conditions. These environmental factors are important variable conditions in the development of bone density and in the prevention and treatment of osteoporosis (OP).

Methods: In this study, 200 females aged between 42 and 84 years old in the postmenopause stage were evaluated with the aim to investigate how smoking and coffee consumption, especially in the premenopause stage affects the bone mineral density (BMD) in the postmenopause stage. The average daily coffee consumption and smoking habits in the premenopause stage and the demographic characteristics, age and duration of menopause of all the cases were identified and noted. The BMD evaluations of these cases were made in the lumbar vertebral region and the femur using the Dual Energy X-ray Absorbtiometer (DEXA) technique. The relationship of the questioned risk factors with BMD and differences among the groups were investigated.

Results: A negative correlation (p>0.05) was found between the age and duration of menopause of the studied cases with the BMD values. No correlation (p>0.05) was found between the amount of coffee consumption and BMD. The BMD values of the smokers group was lower than non-smokers group (p<0.05).

Conclusions: As a result, advancing age, duration of menopause and smoking habits have been identified to be risk factors in relation to OP. No relationship was found between the amount of coffee consumption and BMD.

PP097

PAIN DISTRIBUTION OF PATIENTS WITH POSTMENOPAUSAL AND SENILE OSTEOPOROSIS

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Objectives: Osteoporosis is a disease characterized by skeletal fragility, represents a major health problem, especially for postmenopausal women. Osteoporosis commonly affects the thoracic and thoracolumbar regions of the spine and may cause debilitating pain. Severe ongoing (chronic) pain in osteoporosis is the result of permanent changes in posture and spine that can affect the rest of body. Osteoporosis itself does not cause pain and there are usually no signs or symptoms. However when fractures occur, or when the posture changes due to osteoporosis, pain can appear.The purpose of this retrospective study was to explore the pain condition of patients with postmenopausal and senile osteoporosis.

Methods: 909 patients followed in our osteoporosis outpatient service were assessed retrospectively. We studied symptoms of pain in postmenopausal women aged between 33 and 89. Menopause age, menopause duration, bone mineral density values (gr/cm2), pain, pain duration and body mass index were recorded.

Results: We found 695 patients (%76.45) with pain and 214 patients (%23.54) without pain. Pain duration of patients with pain was 8.7±5.27 (min: 1, max: 26) years. Our study was detected 82 cervical (%11.79), 77 dorsal (%11.07), 175 lumbar (%25.17), 183 knee (%26.33) and 177 generalise (%25.46) pain according to distribution of patients' regional pain. There was no significant difference on BMD between patients with and without pain (p>0.05).

Conclusions: The spine is one of the areas most prone to bone loss, and back pain can be one of the few symptoms of osteoporosis. Back pain can serve either as an alert to women weakening bones and the potential for injury or as a symptom of a spinal fracture. We did not find changing bone mineral density to be significantly associated with pain in postmenopausal and senile women.

PP098

MEDICAL THERAPY OF OSTEOPOROSIS

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Objectives: Treatment of osteoporosis is aimed at maintaining and increasing bone mass. Biphosphonates and calcitonin are the 2 major groups of drugs used for this purpose. The goal of this study is to evaluate the responses of osteoporotic patients those treatments agents.

Methods: Among patients admitted to our osteoporosis unit, 54 women dignosed as OP were not treated for this disease. 20 of the patients were given risendronate 5 mg/day; 16 of the patients were given alendronate 10 mg/day and 18 of the patients were given calcitonin 200IU/day. All the patients took 1000mg calcium per day in addition this therapies. Bone mineral density is measured by DEXA (Lunar) at the lomber, femoral (neck,wards) area with 6 months of interval. Statiscal analysis was performed by Wilcoxon and Kruscall Wallis test.

Results: Mean BMD is 0.83±10 gr/cm2 for for the lomber area, 0.72±0.9 gr/cm2 for the femoral neck and 0.55±0.13 gr/cm2 forthe femoral wards area before therapy. After 6 months of treatment, values for BMD were 0.84±0.08; 0.71±0.08 and 0.55±0.10 gr/cm2 respectively. No statistical significant difference was found between 3 therapy groups.In evaluation of each groupBMD values before and after therapy we found significant difference in lumbar and femoral BMD in both alendronate and risendronate groups; the difference was significant only in calcitonin group.

Conclusions: There was no a statistically significant difference in the BMD of patients taking different drugs at the end of 6 months.Altough the effects of alendronate, risendronate and calcitonin at the end of 6 month are found to be close to each other,

results obtained after long term follow-up would be more satisfactory.

PP099

OSTEOPOROSIS AND EPIDEMIOLOGICAL FACTORS

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Objectives: Several risk factors are assosiated with osdeoporosis (OP). Some of these factors that effect bone mass are age, gender, ethnicity ,body weight, life style, exercise, habits of nutrition, number of births and genetics.We studied the risk factors and their assosiation to OP in patients with OP in our follow up unit.
Methods: 54 women are diagnosed ac OP on the basis of criteria of WHO for OP. Patients are questioned for number of births, duration of lactation, daily calcium intake, nutritional habbits, exposure to sunlight and level of activity. BMD is measured with DExA (Lunar) on the lomber and femoral sites (neck,wards). Spearman correlation test was used for statistical analysis.
Results: 20% of patients had given 3 births, another 20% of patients had given 4 births,remaning 15 and 1! % had given 5 and 6 births correspondingly.85% of the subjects were not smoking cigarettes. 26% had sedantery, 74 % had semiacdive life-style.Mean BMD was 0.83±0.10gr/cm2 at the lomber region; 0.72±0.09gr/cm2 at the femoral neck and 0.55±0.13 gr/cm2 at the femur wards. When the relation between epidemiological risk factors and BMD are studied, it is found that number of births and being smoker negatively correleted whereas level if activity is positively correlated with BMD. (r:0.243, r:0,338, r: 0.31 and p<0.05 correspo.dingyl)
Conclusions: We have come to the conclucion that daily intake of foods rich in Ca, smoking status,number of births and level of activity corralate with OP, however genetical factors play the major role.

PP100

ANTIOXIDANT ENZYME ACTIVITIES AND TRACE ELEMENT CONCENTRATIONS IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Objectives: Osteoporosis is one of our society's most debilitating and costly diseases to confort elderly women and increasingly men. This multifactorial pathology not only involves genetics, endocrine function and exercise, but also nutrition considerations concerning calcium, Vitamin D, fluoride, magnesium, copper, zinc and other trace elements as well. The aim of this study is do evaluate the concentrations of magnesium, zinc, copper in plasma and erythrocytes as well as the erythrocyte antioxidant enzyme activites in women with osteoporosis.
Methods: The subjects of this study were consisted of 52 postmenopausal osteoporotic and 22 postmenopausal nonosteoporotic women as control group. Erythrocytes antioxidant enzyme (su`eroxide dismutase(SOD) and catalase (CAT)) activites were determined spectrophotometrically in hemolysate. Magnesium, zinc and copper in plasma and erythrocytec concentrations were determined using atomic absorption spectrophotometry
Results: The erythrocytes SOD activites of the patients with osteoporosis were incresed significantly when compared to the values of the control group (p<0,001). Erythrocyte CAT activites of the patients also showed similar reductions that were not significant statistically (p>0,05). Plasma zinc levels of the patients showed a decrease significantly (p<0,001),whereas the erythrocytes zinc levels were increased significantly (p<0,001). Plasma magnesium levels of the patients showe$ a decrease significantly (p<0,001) whereas the erythrocytes magnesium levels of patients showed slight reductions that were not statistically significant (p>0,05). Plasma copper levels also showed similar reductions that were not significant statistically(p>0,05), whereas erythrocytes copper levels were decreased significantly (p<0,001).
Conclusions: There are important alterations in erythrocytes SOD activites and plasma zinc and magnesium levels in postmenopausal osteoporotic women. Our results support the hypothesis that claims the possible role of trace elements, prooxidant and antioxidants in postmenopausal osteoporosis. We conclued that magnesium and zinc supplementation may be effective for preventing osteoporosis in postmenopausal women.

PP101

NEUROHORMONAL DYSFUNCTION AND DEPRESSION IN FEMALES WITH FIBROMYALGIA

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Background: Fibromyalgia (FM) is a clinical entity of unknown aetiology. Although several mechanisms have been proposed for the aetiopathogenesis, these are still obscure. Some current etiologic hypotheses are that FM is a rheumatoid-like disease or a disorder of muscular abnormality or repair; that it results from aberrant mechanisms of peripheral pain; that it is a psychoneuro-endocrine-immune disorder, a psychomatic disorder, or a psychiatric disorder related to major depression. Additionally, there are few studies that examine the inflammatory response system in FM.
Objectives: We aimed to investigate abnormalities of neurohormonal functions females with FM; and to search whether the depression state had any effect on these hormones.
Methods: We examined follicle stimulating hormone (FSH), luteinizing hormone (LH), estradiol, progesterone, prolactin, growth hormon (GH), Dehydroepiandrosterone sulphate (DHEAS) and testosteron concentrations in 51 females with FM and compared matched 30 healthy controls. Depression rate was assessed by Beck Depression Inventory (BDI) and patients with high scores of BDI were compared to patients with low scores of BDI.
Results: There were no significant differences in serum FSH, LH, estradiol, progesterone, prolactin, GH and testosteron between FM patients and healthy controls (p>0.05). DHEAS levels of the FM patients were statistically low with respect to control group (p=0.001). In addition, there were no any significant differences between patients with high BDI score and patients with low BDI score in respect to these hormones (p<0.05).
Conclusions: There was statistically significant difference at serum DHEAS levels and control group. This study has pointed out that there would be neurohormonal disfunction in FM.

PP102

TRANSIENT OSTEOPOROSIS OF HIP: A CASE REPORT

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Objectives: Transient osteoporosis of the hip (TOH) is a rare, self-limiting disorder affecting primarily middle-aged population. In this case report, we present the documentation of treatment of TOH in a nursing mother.

Methods: A 25-year old female was referred with right hip pain that started on the eighth month of pregnancy, and caused limping after delivery. Physical examination revealed limitation of the hip motion and muscle weakness due to pain. Medical history and laboratory results excluded malignancy, hematologic, endocrinologic, inflammatory, infectional and rheumatologic disorder. A plain radiograph of the pelvis demonstrated osteoporosis of the right femoral and acetabular bone. A Tc99m MDP bone scintigraphy confirmed a marked uptake at the right hip. Magnetic resonance imaging (MRI) revealed bone marrow edema of the right femur and acetabulum. Bone mineral density (BMD) of the right femoral neck and trochanter were decreased compared to the left side. She was diagnosed to have TOH.

Results: Bed rest, non-steroid analgesic medication, heat therapy, isometric strengthening exercises, half weight-bearing with cane usage up to two months, flexibility exercises were applied. The patient desired to continue breastfeeding . She was given 1200 mg calcium and 800 IU of vitamin D daily for eight months in the nursing period. Her pain was relieved in three months, left cane usage in four months. After one year follow up her physical examination of the hip was normal. MRI of the right hip demonstrated normal findings. BMD had increased from 0,7775 to 1,0350 g/cm2, and from 0,5411 to 0,6565 g/cm2, in right femoral neck and trochanter, respectively.

Conclusions: Though it is a self-limiting disorder, conservative approach can improve the patient's quality of life. Calcium and vitamin D supplementation can increase bone mineral density even while nursing.

PP103

THE EFFECTS OF RALOXIFENE ON BONE TURNOVER AND BONE MINERAL DENSITY

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Objectives: The aim of this study was to examine the effects of raloxifene 60 mg/day on bone turnover, lumbar spine and femoral neck BMD in healthy postmenopausal women.

Methods: Healthy postmenopausal women with a bone mineral density T-score of lumbar spine or femoral neck below –2.5 were enrolled. Women who received therapeutic doses of any of these medications before study entry were excluded: androgen, bisphosphonates, calcitonin, systemic corticosteroids, estrogen, progestine, calcium and vitamine D preparate with in past 6 months, systemic anticonvulsant, hipolipidemics and floride. Total 39 subjects randomly assigned to two groups. 22 women in first group received raloxifene 60 mg/day and 1200 mg/day calcium, 800 iu/day cholecalciferol suplementation. 17 women in second group received only 1200 mg/day calcium and 800 iu/day cholecalciferol. Subjects were treated for 1 year. Biochemical marker of bone turnover (urinary type 1 collogen N-telopeptides) was measured at baseline, third month and first year. Lumbar spine and femoral neck BMD were measured at baseline and first year.

Results: There were no significant difference in baseline characterictics between two groups . The median values of N-telopeptides were significantly decreased by third month (% 8,400 and % 1.660 respectively $p<0,005$) in both groups. By first year, median values were significantly decreased in both groups (% 26,868 and % 7,903 respectively $p<0,005$). The difference between median changes by third month and first year of two groups were significant ($p<0,005$). The median values of lumbar BMD were significantly increased by first year in both groups (% 7,638 and % 2,403 respectively $p<0,005$) The difference between median changes of two groups were statisticaly significant ($p<0,005$). However there were no changes on femoral neck BMD.

Conclusions: This study demonstrates the efficacy of raloxifene on bone turnover and lumbar spine BMD.

PP104

QUALITY OF LIFE BEFORE AND AFTER TREATMENT IN OSTEOPENIC AND OSTEOPOROTIC WOMEN

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Objectives: To compare life qualities of osteopenic and osteoporotic women before and after treatment.

Methods: In this nonrandomized, comparative study 89 postmenopausal women without osteoporotic fractures were assessed. Spinal and hip bone mineral densities were measured with dual energy X-ray absorpsiometry (DXA). Patients were stratified into two groups as osteopenic (group 1) and osteoporotic (group 2) according to WHO recommendations. Quality of life evaluated before and 1 year after treatment by Nottingham Health Profile (NHP), Quastionneaire of the Europan Foundation for Osteoporosis (QUALEFFO) and Short Form 36 (SF-36). According to the choice treatment which depended on both BMD values and risc assessment, patients in group 1 were divided into three and patients in group 2 into two medical treatment subgroups. The three subgroups in group 1 were antiresorptive treatment with Calcium, Calcium only and no treatment group. The two subgroups in group 2 were antiresorptive with Calcium and Calcium only groups.

Results: The mean age of 46 postmenopausal osteoporotic and 43 osteopenic women were 62.5 and 58.8 years respectively. Durations of menopause were at the average 11.6 and 17.1 years in group 1 and 2. Before treatment there were no statistically significant difference between groups accept difficulty in sleeping assessed by NHP ($p<0.05$). Paitents without any treatment in group 1 was better socially ($p<0.01$) according to QUALEFFO and improved significantly ($p<0.05$) in SF-36 pain and general health scores. In patients who have received antiresorptive treatment, QUALEFFO-social function, SF-36 vitality, pain and global scores improved

significantly. Patients given calcium supplementation were better in QUALEFFO- social function score ($p<0.05$). In group 2, patients on antiresorptive medication were better with respect to NHP sleep ($p<0.01$) and SF-36 global score ($p<0.05$). Patients on Calcium alone improved only in SF-36 emotional role limitations score. After treatment comparetion of the groups were not significantly different between each other.

Conclusions: In osteopenic and osteoporotic patients without fractures, quality of life does not significantly different after 1 year of follow-up. Independently from the administered teatment, both osteopenic and osteoporotic women have increases in some life quality scores at the end of the follow up period.

PP105

OSTEOPOROSIS IN COAL MINERS

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Objectives: Low exposure to sunlight can sometimes lead to vitamin D insufficiencies. Male osteoporosis has been the subject of growing interest over the past few years. This study was planned to investigate the influence of working in colliery on bone mineral density of coal miners.

Methods: 50 underground workers (group I) and 38 age matched surface workers (group II) were included the study. Age, height, weight, duration of work, daily calcium intake, smoking and alchol habbits and current medications were recorded. Subjects who had any medication or disease that might affect bone metabolism were excluded from the study. Liver, thyroid and renal function tests, total blood count, serum calcium, phosphate, parathormone, osteocalcin, alkaline phosphotase levels, urinary deoxypyridinoline, serum 25OH Vitamin D were analysed. Bone mineral density (BMD) of lumbar spine and hip were performed using DXA.

Results: There were no difference in mean age, weight, height and all laboratory parameters between two groups. Lumbar spine and hip BMD were found higher in group I than group II ($p = 0.002$, $p = 0.019$, respectively).

Conclusions: We didn't found a lower BMD in coal miners on the contrary of our expectation. These results could be related to the fact that coal miners are obliged to heavy weight lifting on work hours and they receive sufficient amount of sun-light on out of work hours.

PP106

EVALUATION OF BONE MINERAL DENSITY (BY DEXA) AND BONE PARAMETERS IN MILD AND MODERATE RENAL INSUFFICIENCY PATIENTS

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Objectives: Renal osteodystrophy is one of the well-known complications in patients with chronic renal insufficiency. Serum i-PTH, Ca, P, ALP levels and bone mineral density measurements are helpful non-invasive evaluation methods. In our study, we evaluated parameters like bone mineral density (by DEXA), bone parameters and electrolytes in mild and moderate renal insufficiency patients

Methods: We analyzed 39 patients who were diagnosed as osteoporosis and chronic renal insufficiency and who were followed in Physical Therapy and Rehabilitation Department, Osteoporosis Clinic and Nephrology Outpatient Clinic between March 2003 and March 2004. The control group consisted of 22 patients whose diagnosis was osteoporosis but who had normal renal function. The inclusion criteria were, being between ages 40-70, creatinine clearance between 30-70 ml/min in case group, >70 ml/min in control group and to be followed in Nephrology or Osteoporosis Outpatient Clinics. The patients whose creatinine clearance was <30 ml/min and whose bone mineral density was normal or who had only osteopenia were excluded from the study.

Results: In mild and moderate renal insufficiency patients there was no significant difference in iPTH , albumin and creatinine levels. At this renal insufficiency levels, erthyropoietin and vitamin D metabolism were not impaired. There was no Renal Osteodystrophy due to secondary hyperparathyroidism in the case group. Despite these findings serum P, urea and Na levels were significantly higher than in the control group. The mean femur neck BMD, t and z scores in the case group were significantly lower than in the control group. There was no Adynamic Bone Disease in the case group. Mean weight in the case group was significantly lower . Although the number of patients who had higher i-PTH levels were higher in the case group, there was no significant difference between two groups.There was no significant difference in mean hemogram values between two groups.

Conclusions: In patients with osteoporosis we should be aware of Adynamic Bone Disease and Secondary Hyperparathyroidism and we should treat these patients according to their status. Serum i-PTH, Ca, P, ALP levels and bone mineral density measurements are helpful non-invasive evaluation methods. We should not supress i-PTH levels by wrong treatments which may cause Adynamic Bone Disease. Further detailed investigations are needed to show the relations between Renal Osteodystrophy and osteoporosis.

PP107

THE EFFECTS OF RISEDRONATE THERAPY COMBINED WITH VITAMIN D AND CALCIUM ON BIOCHEMICAL MARKERS OF BONE TURNOVER AND BONE MINERAL DENSITY IN PATIENTS WITH PRIMARY POSTMENOPAUSAL OSTEOPOROSIS.

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Objectives: The Aim of the study was to investigate the effects of risedronate therapy combined with vitamin D and calcium on bone mineral density(BMD) and biochemical markers of bone turnover in patients with primary postmenapausal osteoporosis.

Methods: Fifteen osteoporotic postmenopausal woman were included in this study. Dual energy X-Ray absorbsimetry(DEXA) was used for the mesurement of BMD of the lumbar spine and proximal femur before and after the study period. In addition calcium, phosphor, alkaline phosphatase(ALP), tartarat resistant acid

phosphatase (TRAP), osteocalcine levels were measured in blood and C-terminal telopeptide(CTX1) in the urine samples . All patients were given daily doses of 5 mg risodronate, 1000 mg elementary calcium and 500 IUvitamine D during one year study period.

Results: There were no significant changes in serum magnesium,phosphor and TRAP levels after one year therapy (p>0.05).Calcium and ALP levels were significantly lower than baseline (P<0,01).Osteocalcine and CTX levels were found decreased more significantly (p<0.001).Lomber and proximal femur BMD's from all region were found to be significantly increased at the end of one year(p<0.01).

Conclusions: Our results demonstrated that risedronate therapy combined with calcium and vitamin D for postmenapausal primary osteoporosis results in significant increases in spinal and femur BMD's.This effect was confirmed by changes in biochemical marker levels of bone turnover.

PP108

THE EFFECT OF AGING ON BONE MASS IN HEALTHY MEN

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Objectives: Bone mineral density (BMD) declines with age in both men and women predisposing the elderly to osteoporosis and fractures. Most cases are secondary to disease or to drug therapy, but in 30-45% of affected individuals no cause can be identified. Therefore, it is necessary to determine the effect of aging on bone mineral density (BMD) in healthy men.

Methods: In this study, bone mineral densities of the proximal femur and spine were studied in 97 men aged 20-80. Exclusion criteria were history of fracture, medications which affect bone mineral metabolism and abnormalities in physical examination and in laboratory test results. BMD of the lumbar region, neck of the left femur, trochanter, total femur and Ward's region were measured by DEXA. Cases were classified under the age groups. BMD values of the groups were compared. The relationships between BMD and age were investigated.

Results: The mean age at study was 52,44±13 years old. The mean BMD(gr/cm2) ±SD values of the lumbar spine and femoral region in male patients are summarized in Table 1.The peak BMD values at all skeletal sites were measured. Peak values were reached in men between 20 and 29 years of age. The declines in BMD values of the femoral region were more significant between 30-39 years of age. At the lumbar region, low and steady declines in BMD values were found. BMD values at the skeletal sites measured, declined significantly with age (p<0.001).

Tables:

1,123	0,983	1,001	1,146	14
1,070	0,744	0,770	0,906	15
1,030	0.680	0,758	0,880	14
0,684	0,684	0,819	0,868	17
1,035	0,691	0,760	0,818	28
0.822	0,706	0,860	1,080	9
1,052	0,618	0,698	0,898	97

Conclusions: In conclusion, our results show that the peak BMD values of the male population were reached between 20-29 years of age and BMD values started to decline after 30 years of age in healthy men.

PP109

EVALUATION OF THE EFFECTS OF POSTMENOPAUSAL OSTEOPOROSIS ON THE MANDIBLE AND APPLICATIONS OF DENTAL IMPLANTS ON POSTMENOPAUSAL OSTEOPOROTIC PATIENTS

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Objectives: The aim of this randomised controlled study was to evaluate the osseointegration rate of dental implants placed in the mandibular anterior region, to compare BMD of mandible with BMD of lumbar region, radius and total skeleton and to investigate the correlation between BMD's with bone resorption and bone formation markers.

Methods: 36 osteoporotic and edentulous women are included in our study. We formed two different groups whom prescribed alendronate+Ca+Vitamin D (n=23) and whom prescribed only Ca+Vitamin D (n=13). 5 people from each group received mandibular dental implants. We measured markers such as BALP, N-Telopeptid(s), N-Telopeptid(u), pyridinolin and deoxypridinolin and we also checked the BMD's of mandible lumbar region, radius and total skeleton at the beginning and at the rate of 6 months.

Results: As a result, there weren't any implant loss in both groups during the follow-up period. Alendronate increased the BMD of mandible as the same time of the BMD of the skeleton parameters while correlating with the bone resorption and bone formation markers.

Conclusions: We concluded that PO had no negative effect on the osseointegration of dental implants.

PP110

THE CORRELATION BETWEEN URINARY CALCIUM EXCRETION AND BONE MINERAL DENSITY IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN

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Objectives: Our aim is to find out the correlation between lumbar and femoral bone mineral density (BMD), urinary calcium excretion (urinary calcium in 24 hours, the ratio of urinary calcium /urinary creatinin in 24 hours) and other variables like age, body mass index (BMI),duration of menopause.

Methods: Thirty eight women were included in this sectional study. Patients receiving diuretics, calcium and/or vitamin D for the last 3 months and patients with hyperparathyroidism and other risk factors for osteoporosis were excluded. Age, BMI, duration of menopause, urinary calcium in 24 hours and the ratio of urinary calcium /urinary creatinin in 24 hours were recorded for each patient. The correlation between these results and BMD (lumbar, femoral neck, femoral total T-scores in dual energy X-ray absorbtiometry) were evaluated.

Results: 8 years and±The mean age of the patients was 63 10 years. In the correlation analysis with±average duration of menopause was 18 one variable: Femoral neck T- score was correlated with age, the ratio urinary calcium /urinary creatinin in 24 hours and duration of menopause. Total femoral T- score was only correlated with the ratio of urinary calcium / urinary creatinin in 24 hours. Lombar T-score was not correlated with any of these variables. In the multiple linear regression analysis: For femoral neck T-score, age and the ratio of urinary calcium /urinary creatinin in 24 hours were independent variables. For femoral total T-score the ratio of urinary calcium /urinary creatinin in 24 hours was an independent variable.

Conclusions: Urinary calcium excretion is negatively correlated with BMD. In the evaluation of urinary calcium excretion ; the ratio of urinary calcium to urinary creatinin could be more significant than absolute value of urinary calcium. These ratios are found to be more correlated with BMD especially in the older patients.

PP111

QUANTITATIVE BONE SCINTIGRAPHY IN SEVERELY OSTEOPOROTIC WOMEN

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Objectives: To determine unsuspected fractures in severely osteoporotic women by scintigraphy and to assess the correlation between bone mineral density and uptake in bone scintigraphy.
Methods: Fifty osteoporotic women between 45 and 80 years (66.1±7.6) were recruited for the study. All but 2 patients were in the postmenopausal period. Bone mineral densities were measured using dual energy X-ray absorptiometry (DXA) and WHO criteria were used for osteoporosis determination. Patients were divided into 4 groups according to their DXA values. All risk factors for osteoporosis including previous fracture history were questioned. Bone scintigraphy was performed to assess presence of fracture. Uptake of 99mTc MDP was calculated.
Results: Mean T scores at L1-L4 and femoral neck region were -3.19±0.84 and -2.87±0.90, respectively. Seven fractures were detected by scintigraphy (14%). Upon dividing into groups; there were 8 patients in Group 1 (-4.5≤ T score<-4.0), 11 patients in Group 2 (-4.0 ≤ T score<-3.5), 23 patients in Group 3 (-3.5≤ T score≤-2.5) and 8 patients in Group 4 (-2.5< T score). There was no difference between groups concerning fracture. The most important factor influencing fracture is the age of patient ($p<0.01$). Uptake of Tc MDP was negatively correlated with T scores at lumbar spine ($r= -0.324$, $p<0.05$) and femur ($r= -0.439$, $p<0.01$).
Conclusions: Bone scintigraphy is highly sensitive for local complications of osteoporosis like fracture. Uptake of 99m Tc MDP decreases diffusely in osteoporosis. Although these features are usually not of diagnostic importance, they may alert a physician to the presence of osteoporosis if not previously suspected.

PP112

OSTEOARTHRITIS-OSTEOPOROSIS RELATION IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objectives: It is widely accepted that a contrary relation exists between osteoarthritis (OA) and osteoporosis (OP). However, some studies suggest that OA and OP may coexist together and one does not inhibit the development of the other. In this study, we aimed to evaluate the relation between OA and OP.
Methods: One hundred fifteen female patients, mean age 64.4±6.8 years (range 45-82), with knee osteoarthritis volunteered in the study. Staging of osteoarthritis was made according to the radiologic criteria developed by Kellgren and Lawrence. Bone mineral density of lumbar 1-4 vertebraes (anteroposteriorly and laterally) and right hip (proximal femoral neck, Ward's triangle, trochanteric and intertrochanteric area) were measured by Dual X-ray Absorbtiometry (DEXA) in 115 patients. Patients who had T scores below –2.5 were diagnosed as osteoporosis; T scores between –1 and –2.5 as osteopenia and T score above-1 as normal.
Results: According to the bone mineral density results of lumbal 1-4 vertebraes; 37 patients (%21,18) had normal, 8 (%6.95) had above normal, 37 (%32,18) had osteopenic and 33 (%28,69) had osteoporotic bone mineral densities. According to the bone mineral density results of hips; 34 (%29,57) patients had normal, 4 (%3,48) had above normal, 48 (%41,74) had osteopenic and 29 (%25,21) had osteoporotic bone mineral densities. Our results supported the opinion that OA and OP may sometimes coexist together. When osteopenic patients were also taken into consideration; %64, 34 of the patients had low BMD in the lumbar region and %71 in the hip region. Thus, most of the patients with OA had also low BMD.
Conclusions: We concluded that high BMD was not an obligation in the development of OA; in contrast, OA was also common in patients who had low BMD. Therefore, it can be assumed that low BMD and OA frequently coexist together in aged population.

PP113

LENGTH OF ACHILLES' TENDON AND ITS EFFECT ON THE GAIT OF A POLIO PATIENT: ANALYSIS AND LITERATURE REVUE

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Purpose: To illustrate the importance of a relatively short Achilles' tendon and the work of the plantar flexor muscles in knee locking of a polio survivor female.
Methods: After a period of medial knee sprain, this 40 years old patient had a complete rehabilitation program during several months. Concomitantly, her gait was observed and analyzed.
Results: During her recovery, she presented 3 types of gait. First she used 2 crutches. Secondly, she chose to diminish progressively the height of her heel from 6 cm to 0 cm, abandoned crutches, and walked putting her hand on her thigh with fear to fall. Last, she progressively augmented the height of her heel to return after several months to 6 cm and walk with confidence.
Discussion: We think that the force of her quadriceps and its progression was the reason for she adopted these kinds of gait. After she recovered her extension passive lack (due to knee injury) she diminished the height of her heel (lengthening her Achilles tendon progressively) because this helps" locking" the knee passively. The quadriceps getting stronger, she chose to augment progressively her heel height (shortening the Achilles tendon) because this helps her adopt Toe Walking pattern which helps" locking" the knee actively. A literature revue on the possible biomechanical explanation of each phase of recovery is discussed.
Conclusion: the high heel and secondarily a short length of the Achilles tendon, and a better tension of the plantar flexor muscles are important factors to help weak quadriceps, while adopting Toe Walking gait, locking the knee actively in this patient.

PP114

BONE MINERAL DENSITY AND BONE TURNOVER MARKERS IN PATIENTS WITH PSORIATIC ARTHRITIS

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Psoriasis is a common inflammatory skin disease and conflicting data have been published about osteoporosis and bone turnover markers in patients with psoriatic arthritis.
The aim of this study was to assess bone mineral density (BMD) and bone turnover markers in psoriatic patients with and without peripheral arthritis and to investigate the relationship between clinical parameters and markers of bone turnover.
Fortyseven paients (30 female, 17 male) with psoriasis were included to the study. Demographic data and clinical characteristics including age, sex, disease duration, severity of skin disease assessed by Pasi score, pain of peripheral joints assessed by VAS, ESR, CRP were recorded. The patients were divided into two groups according to their peripheral arthritis status. BMD was determined for lumbar spine and total hip by DEXA. Serum Ca, P, ALP and serum alpha-2 N telopeptid (NTx) were measured as bone turnover markers in all patients. QUALEFFO was used to assess quality of life related to bone loss.
Eighteen patients had peripheral arthritis. None of the patients had radiologically assessed axial involvement. All the female patients were premenopasual. The demographic data and clinical characteristics of bought groups are shown in Table 1. There was no significant difference according to age, sex and disease duration between the groups. Table 2 indicates BMD, bone turnover markers and QUALEFFO scores of the patients. The mean ALP and NTx values were higher and BMD values at lumbar and femoral head were lower in patients, with arthritis, than in nonarthritic patients, but the difference was not statistically significant ($p>0.05$). The Z scores of L1-4 were significantly lower and total QUALEFFO scores were significantly higher patients with arthritis, than in other group ($p<0.05$). No correlation was found between bone loss and joint inflammation markers and severity of skin disease.
In conclusion psoriatic patients with peripheral arthritis may be at a risk for osteoporosis, that can lead to impairment in quality of life related to bone loss.

PP115

RALOXIFENE EFFECT ON OTONOM NERVE SYSTEM AND QUALITY OF LIFE

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Background: Vasomotor symptoms that affect the quality of life of postmenopausal women, such as hot flashes (flushing) and sweating (including night sweats) occur in the postmenopausal women. Raloxifene do not alleviate vasomotor symptoms associated with estrogen loss and often exacerbate their frequency and /or intensity. Sympathetic skin response (SSR) test should allow assessment of sympathetic sudomotor function.
Objectives: The purpose of the study was to evaluate the short term effects of raloxifene on autonomic function and quality of life in the healthy postmenopausal women.
Methods: In this study SSR was performed for the upper and lower limbs of 30 (58.33 ± 5.18 yr, range 48-68) with postmenopausal patients, who received 60mgr/day of raloxifene plus 500 mgr/day calcium as "Raloxifene Group" and 20 healthy women (59,90 ± 7.34 yr, range 50 -70) as "Control Group" without any systemic or local disease. SSR was recorded from the palmar, plantar region at baseline and 24 th week. Three domains (somatic symptoms, vasomotor symptoms and anxiety/fears symptoms) of Women's Health Questionnaire (WHQ) were used in our study at baseline and 6 months intervals. The statistical analyses were done by Wilcoxon test, Mann Whitney-U test and Spearman's rank correlation.
Results: The findings indicated a significant difference latency in the hand of the two groups at the baseline ($p<0.001$). There was statistically significant difference in the amplitude and latency value of hand at the end of treatment ($p<0.001$). Mean scores for vasomotor symptoms did not change significantly in raloxifene group ($p>0.05$). Mean scores for anxiety /fears and somatic symptoms significantly improved in the raloxifene group ($p< 0.01$, $p<0.001$, respectively). After 6 months of treatment, there was no statistically significant difference in the incidence of hot flashes between the two groups. There was statistically correlation between SSR and scores of WHQ ($p<0.001$, $r=0,560$).
Conclusion: Most quality of life domains were not affected by treatment with raloxifene. The 60 mgr/day dose of raloxifene improved anxiety levels in postmenopausal women and was found to preserve overall quality of life as measured by using the WHQ. Raloxifene therapy did not affect the occurrence of other climacteric symptoms commonly affecting the quality of life of women after menopause.

PP116

ASSESSMENT OF THE QUALITY OF LIFE OF PATIENTS 1 YEAR AFTER STROKE

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Objectives: Cerebrovascular accident causes multiple disorders and these patients become invalids with specific social problems, caused either by physical and mental disability, which requires conditions for self-support, economic and social reintegration. The purpose of this study is to identify differences of the quality of life of patients 1 year after stroke by using The Functional Independence Measure (FIM), Zung Scale, Mini Mental State Examination and Social Support Questionnaire in relation of etiology, lateralization, and location of lesion, and to compare with healthy persons.
Methods: The study was conducted on 60 stroke survivors who were treated at the Clinic for medical rehabilitation of the Clinical Center Novi Sad. The evaluation was done at rehabilitation admission, at discharge, and 1 year after discharge. Control group includes 60 healthy persons, same age, different sex and proffessions.
Results: The obtained results show that after conducted rehabilitation treatment there are statistically significant improvements in all scales ($p<0,01$). As well with some insignificant aggravation, these scores persist 1 year after stroke ($p>0,05$). All results are significantly worse comparing to healthy persons ($p<0,01$). Comparing to sex, lateralization, etiology, and location of lesion there are no satistically significant differences ($p>0,05$).
Conclusions: The results of the study show that the quality of life of stroke survivors are significantly better after rehabilitation treatment and persists 1 year after stroke with insignificant changes, although are still worse comparing to healthy persons.

PP117

COMPARISON OF QUALITY OF LIFE AND DISABILITY IN PATIENTS WITH RIGHT-SIDED AND LEFT-SIDED STROKE

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Objectives: It has been suggested that stroke lesion location can be of paramount importance for the patient's quality of life (QoL). The

aim of the present study was to describe the disability and the QoL of patients 3 months after stroke and to analyze the impact of lesion locations on the QoL of patients.

Methods: The study sample was comprised of 81 patients with stroke aged 31-80 years (mean, 62.3 years). The lesion locations were categorized as either right-sided (n=46), or left-sided (n = 35). Disability was assessed with the Modified Barthel Index (BI). Proxy reporting quality of life was measured using both components of the EQ-5D scale, the index score and the Visual Analogue Scale (VAS).

Results: Groups were balance with age, gender, highest year education completed, marital status, and the number of co-morbid conditions. Mean BI score was 8.9 ± 6.3 in patients with right-sided stroke, while it was 8.5 ± 5.3 in patients with left-sided stroke (z= -0.201, p= 0.841). Patients in both groups had relatively good QoL in the dimensions of Pain or Discomfort and Anxiety or Depression. They had a somewhat more problems in the Mobility dimension and much more problems in the Self-care and Usual Activities. However, there were no significant differences between groups in respect to these dimensions, and the index score (all p's >0.05). There was also no significant difference between groups for the scores of VAS (z=-0.480, p= 631).

Conclusions: No significant differences in QoL profiles were found between right-sided and left-sided strokes. Our findings do not support the arguments that the QoL is quite different between left- and right-sided stoke survivors. However, because there were no detailed data available on the lesion location, this finding is not generalizable to all stroke patients.

PP118

IMPACT OF THE NEW SYMPTOMS OF POST-POLIO SYNDROME ON QUALITY OF LIFE

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Objectives: To investigate the impacts of the new symptoms on life qualities of the patients with post-polio syndrome(PPS).

Methods: 64 patients with the diagnosis of poliomyelitis were included in the study. Among the patients, 44 (68.7%) fullfilled the criteria of PPS. The most common symptoms acknowledged by the patients with PPS were fatigue, weakness, muscle cramps and pain. The Nottingham Health Profile (NHP), Fatigue Severity Scale (FSS) and Fatigue Impact Scale (FIS) were applied to the patients with and without PPS and 30 healthy controls.

Results: NHP revealed that, although the patients without PPS tended to have higher scores compared to the control group, the difference reached the significant level only for the physical mobility dimension, leading significant difference in the total score. Patients with PPS demonstrated significantly higher level of distress in all dimensions except sleep disturbances comparing to the controls. They had significantly higher levels of distress in the dimensions of energy, pain and emotional reaction than the patients without PPS, while there were no significant differences in the dimensions of physical mobility, sleep and social isolation. Total score was also higher in the patients with PPS comparing to the patients without PPS and controls. Fatigue severity was found to be greater in the patients with PPS comparing to the controls and to the patients without PPS; as demonstrated with the significantly higher total score of FSS, but not significantly different in the patients without PPS comparing to the controls. Comparison of FIS scores between the groups revealed that, fatigue has significant impacts on physical activities but not on the social life and cognition.

Conclusions: This study demonstrated that, the impact of poliomyelitis is mainly on mobility-related activities, unless the patients face new symptoms which further impair their life qualities.

PP119

QUALITY OF LIFE , ANXIETY AND DEPRESSION LEVELS OF PATIENTS WITH CONGESTIVE HEART FAILURE AFTER A CARDIAC REHABILITATION PROGRAMME

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Objectives: The aim of this study is to evaluate if cardiac rehabilitation programme improves the quality of life, anxiety and depression of patients with congestive heart failure.

Methods: 27 patients with cronic heart failure according to New York Heart Association stage II-III were included in the study. Patients were randomly assigned either to cardiac rehabilitation or to control group. After randomisation 13 patients were allocated to a regulary weekly aerobic walking programme on treadmill, three times a week for 2 months and 14 patients served as controls who did not recieve any exercise training. Patients were assesed by ergospirometric exercise test, Hacettepe Quality of Life Questionnaire (HqoL), Beck Depression Inventory (BDI), Spielberg Trait Anxiety Inventory (STAI) at the beginning of the study and 2 months later in both groups. Primary outcome measures were HqoL, BDI, STAI and secondary outcome measures were exercise test duration, MET levels, peak O2 consumption.

Results: Significant increase in exercise time and MET levels were recorded in the treatment group ($p<0.027$, $p<0,043$). There was no difference in the control group between pre and post evaluation. Significant decrease in BDI was recorded in the treatment group ($p<0,009$) and an increase was recorded in BDI in the control group which did not reach to statistical significance. Significant decrease in STAI in the treatment group ($p<0,001$) and an increase in the control group ($p<0,043$) was recorded. There was no change in peak O2 consumption levels and quality of life in both groups.

Conclusions: Patients with cronic heart failure well tolerate aerobic exercise programmes and this results with improvement in both physical and psychologic wellbeing.

PP120

THE COMPARISON OF LIFE QUALITY AND EMOTIONAL CONDITIONS ON MECHANIC AND INFLAMATUAR BACK ACHES

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Objectives: In order to see the effects of how active can influence the patients life quality and emotional conditions, the control groups of chronic mechanic back ache (CMBA) which is better and the chronic inflamatory low back ache (CIBA)which is worse and may cause dısability are compared and show their roles in the life quality and emotional conditions of the patient.

Methods: This study is concluded by observing control groups of 30 active cases of chronic mechanic back ache, 30 active cases of chronic inflamatory low back ache which were diagnosed as ankilozan spondylitis who have applied to our hospital between september 2002 and January 2004 and the medical team of healthy hospital personel of 30 people. 3 groups of CMBA, CIBA, CG were grouped the same number of people. All patients, life quality

evaluation SF-36 and NHP forms and emotional condition and BECK depression scala were calculated. They were compared with statistical analysis.

Results: There were no statistical differences between the age and illness periods of the patients in both groups. The ages of the patients in our control group were significantly high. When the groups were compared all parameters in the control group were negative. In the evaluation between CMBA and CIBA groups, there were no statistical differences between Life quality criterias and emotional condition criterias.

Conclusions: The life quality and emotional condition are effected in CMBA groups as well as CIBA groups. Therefore,in medical treatments of CMBA and CIBA patients besides the teatment of ache and joint movements the restoration of life quality and emotional condition should also take their places in medical treatment protocol.

PP121

QUALITY OF LIFE IN PATIENTS WITH CARPAL TUNNEL SYNDROME

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Objectives: The purpose of the study is to evaluate the relationship between nerve conduction studies, health related quality of life and self administered Boston Questionnaire that measures the severity of symptoms and functional status in patients with idiopathic carpal tunnel syndrome (CTS).

Methods: Fifty-five patients with idiopathic CTS were enrolled to the study. Sensory and motor nerve conduction velocities were determined and patients were grouped according to the electrophysiological findings as mild, moderate and severe CTS. Phalen's, Tinnel's Tests, Semmes Weinstein, two point discriminations were performed. To evaluate the functional outcome grip, key, pulp pinch were measured. Health related quality of life, Short Form -36 (SF-36) general health survey and Boston Questionnaire were full filled.

Results: Boston functional status outcomes were significantly different in patients with moderate CTS compared to patients with mild CTS, SF-36 scores were correlated with Boston Questionnaire and grip, key, pulp pinch measurements.

Conclusions: Disease specific questionnaires are correlated with general health status assessments and SF-36 reflects symptoms and functional status in patients with CTS.

PP122

THE CORRELATION OF CLINICAL PARAMETERS WITH QUALITY OF LIFE IN BEHÇETS DISEASE PATIENTS

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Objectives: Behçets Disease (BD)is a multisystem disorder with musculoskeletal involvement. The clinical course is chronic and fluctuating.We aimed to analyse the correlation of quality of life with the parameters of current clinical activity in Behçets Disease.

Methods: Ninety-three Patients with BD diagnosed according to the International Behçets Disease Study Group Criteria and 90 healthy subjects matched for age, gender were included. Disease Activity was assessed with Behçets Disease Current Activity Form (BDCAF)and quality of life with Nottingham Health Profile (NHP).

Results: A significant negative correlation was found between clinical activity and total NHP scores.Patients with pain differed from those without pain and the highest NHP mean total score was seen in patients within the pain subset. Significant differences between patients and controls were evident for Energy, Emotional Reactions, Sleep, Social Isolation and Distress ($p<0.001$).

Conclusions: The perception of quality of life is negatively affected by clinical activity in Turkish patients with BD. Our study supports the need for particular attention for pain in this group of patients.

PP123

MUSCULOSKELETAL PAIN IN MEDICAL STAFF

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Objectives: Organic pathology can not be found in a majority of musculoskeletal pain patients. Etiology is generally multifactorial and the most important cause of non-spesific pain is working conditions. The aim of this study is to determine the frequency of non-spesific musculoskeletal pain in the medical staff and their level of knowledge.

Methods: 206 medical staff from four different hospitals with no specific musculoskeletal disease were evaluated with a structured questionnaire and location, intensity (VAS) and duration of pain, accompanying symptoms, factors that increase pain, daily activity of sports, causes of the pain and appropiate treatment methods were asked.

Results: 39.7% of the participants did participate in any sport activity while 48.9% performed regular walking as a sport. 12.1% of the participants are declared no pain. Location and intensity of pain disintegration according to subgroups in the medical staff are given in the below table.32% of the participants declared that the reason of their pain is the result of abnormal postural and activity patterns and 43% of them believed that the best therapy is exercise.

Tables:

2.6	32.2	Back
3.4	29.4	Neck
3.6	24.1	Back
3.2	20.0	Back

Conclusions: Medical staff is one of the groups carrying high rate for musculoskeletal diseases. Education of the medical staff seems insufficient in this subject. We need an educational course for these people to teach them methods of protection and prevention.

PP124

THE EFFECT OF TIBIA POSITION ON THE STRENGTH OF HAMSTRINGS AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION.

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Objectives: To investigate the effect of tibia position on the strength of hamstrings after anterior cruciate ligament reconstruction. Relevance: Clinically, therapists rarely consider the position of the tibia during strengthening of hamstrings muscle.

Methods:Thirty patients with ACL reconstruction voluntarily participated in this study. Isometric strength of hamstring muscle in both legs was measured using a Nicholas hand-held dynamometer. The strength of hamstrings was measured in three

different conditions: (1) tibia in anatomical neutral position, (2) tibia in maximum medial rotation and (3) tibia in maximum lateral rotation.

Results: Repeated measure ANOVA showed that the tibia position had a significant effect on the strength of hamstrings in the ACL reconstructed leg ($p<0.02$), but not in the normal leg ($p<0.21$).

Conclusions: It seems that patients with ACL reconstruction developed imbalance strength between hamstrings parts. Such imbalance may be resulted from negligent of tibia position on horizontal plane during hamstings strengthening program

PP125

ACL RECONSTRUCTION IN BLIND ATHLETE

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Objectives: Anterior cruciate ligament (ACL) injuries often result in a premature end of a career of the athletes. The treatment after rupture of the ACL may be operative or conservative. Herein, we present an ACL rupture of a blind athlete, who was treated with ACL reconstruction.

Methods: A 24-year-old amateur goal-ball player and shot potter athlete, who had a total ACL rupture, was followed with conservative treatment for 6 months. Because of having giving-way many times during the sportive activity we decided to perform an ACL reconstruction. Arthroscopic ACL reconstruction was performed with anterior tibial tendon allograft and fixation was done by bioabsorbable screws (Smith and Nephew) and a staple.

Results: No complications occurred postoperatively and after 3 months of postoperative rehabilitation and proprioseptive exercise program, we started sport specific exercises and balance training with Biodex Stability Systems (Biodex, Inc., Shirley, New York). He returned to his preinjury level of sportive activities at the end of six months without any complaint.

Conclusions: In conclusion ACL reconstruction can be performed successfully in blind athletes, who were involved actively within the sportive activities.

PP126

FROZEN SHOULDER AFTER HEART DEFIBRILLATION AND CATHETERIZATION

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Objectives: With this poster and after a careful revision of the literature, we intend to discuss more deeply the ethiopathogenic theories about this entity. Also we would like to emphasises the association between cardiac defibrillation, cardiac catheterization and frozen shoulder.

Methods: Frozen shoulder after heart defibrillation and catheterization Introduction Frozen shoulder or adhesive capsulitis is a very popular theme nowadays. These terms are used to describe an array of clinical conditions that have in common, restricted and painful motion of the gleno-humeral joint unassociated with trauma. We are a presenting a clinical case of a patient that developed complaints of this condition secondary to early heart defibrillation in the context of cardiac arrest due to myocardial infarction. Clinical Case L.A.T.L, male, Caucasian, 58 years-old, civil engineer with a past history of arterial hypertension and dyslipidemia. He has no diabetes. In June 2003, he was admitted in the emergency department with a myocardial infarction with ST elevation revealing a posterior inferior and lateral walls involvement. In the acute phase he had ventricular fibrillation that was reversed with a 200 J shock. After 3 hours of evolution he was submitted to percutaneous coronary catheterization. He was admitted in the coronary unit where he stayed for 5 days. One week after he was discharge, he developed an ecchymoses on the lateral aspect of his right arm, pain and limited range of motion of his right shoulder. In one month the clinical picture got worsen and he was diagnosed a frozen shoulder. Then, the patient started a rehabilitation programme for about 6 months, with satisfactory clinical results. Objectives: With this poster and after a careful revision of the literature, we intend to discuss more deeply the ethiopathogenic theories about this entity. Also we would like to emphasises the association between cardiac defibrillation, cardiac catheterization and frozen shoulder.

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PP127

DIAGNOSTIC VALUE OF MAGNETIC RESONANCE IMAGING IN ANKLE PAIN

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Objectives: To investigate the patients presented with ankle pain that were unresponsive to conservative treatment and of whom plain radiographies were normal.

Methods: 50 patients who presented to our outpatient department with a complaint of moderate swelling on the ankle unresponsive to the conservative treatment and of whom plain radiographies were found to be normal were included in the present study. All patients underwent MRI study as a further investigational method. Non-steroidal anti-inflammatory drugs, local immobilization and cold application were used as conservative treatment methods.

Results: The plain radiographies of the patients with moderately severe pain with moving and palpation and moderate swelling without findings suggestive of instability were found to be normal. The following findings were found on MRI scanning particularly in the tibiotalar joint: degeneration, effusion evidence around the ligament or tendon, soft tissue edema, anterior and posterior

talofibular joint tear, fracture, osteochondral lesion (one of these was osteochondral lesion in the sinovial fluid), deltoid ligament ganglion, epin calcanei, os trigonum syndrome and connective tissue disease.
Conclusions: These findings suggested that X-ray findings might fail in revealing the causes of ankle pain and MRI investigation should be considered as a further investigation in the patients when required. The fact that MRI is an expensive method may lead us to hesitate to use it. But it is an investigational method that should be performed in the patients with long lasting or unexpected findings unresponsive to the conservative treatment.

PP128

EFFICACY OF ULTRASOUND TREATMENT COMBINED WITH SUPERFICIAL HEAT, TENS AND EXERCISE IN THE TREATMENT OF ADHESIVE CAPSULITIS

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Objectives: To evaluate the efficacy of ultrasound application (US) when combined with superficial heat, TENS, range of motion (ROM), stretching and strengthening exercises in patients with adhesive capsulitis.
Methods: In this prospective, randomized, controlled and double-blind clinical study, 30 patients with shoulder pain and diagnosed clinically as adhesive capsulitis were evaluated. Patients were randomized into two physical modality treatment group, one combined with ultrasound treatment (1.5 W/cm², 1 MHz, 8 min.) and the other with sham ultrasound treatment. Treatments were applied 3 times per week during 5 weeks. Patients were evaluated at the inclusion time, after the treatment and subsequently in 1.5, 3 and 6 months. Evaluated variables were pain (VAS), ROM, shoulder disability (UCLA and Shoulder Disability Questionnaire (SDQ)) and general health quality (SF-36).
Results: Demografic variables were not significantly different between the groups ($p>0,05$). Patients were composed of 14 men and 16 women, mean age was 55,6 years and mean complaining time was 22 weeks. In 15 patients (%50), dominant arm was influenced. The improvement in both treatment groups at the end of the treatment period were statistically significant with respect to VAS, ROM, disability and life qualities ($p<0,01$). The improvement continued in the following 1.5, 3 and 6 months. The rate of benefit was not significantly different between the groups ($p>0,05$).
Conclusions: In molecular level and in vitro studies, positive effect of US application is well demonstrated and frequently used for the treatment of adhesive capsulitis. While US is frequently combined with other effective treatment methods, we were unable to prove the superiority of this modality when used with other physical therapy agents for 5 weeks treatment period and 6 months follow up.

PP129

CASE REPORT: RAPID IMPROVEMENT IN ANKLE STRENGTH, ANKLE PAIN AND WALKING DISTANCE IN A PATIENT WITH TRIMALLEOLAR FRACTURE AFTER A CONCISE ISOKINETIC ANKLE STRENGTHENING PROGRAM

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Objectives: To report the rapid improvement achieved in ankle strength, ankle pain and walking distance in a patient with trimalleolar ankle fracture by a concise isokinetic ankle strengthening program.
Methods: A 24 year old female with a left trimalleolar ankle fracture admitted to our isokinetic test and exercise unit 23 months after the fall. She had been treated by open reduction and internal fixation and the internal fixation material was extracted 14 months ago. She was complaining of ankle pain, limitation of ankle range of motion, weakness in ankle muscles and difficulty in walking and in climbing stairs. Isokinetic tests which were carried out by an isokinetic dynamometer (Biodex Corp., Shirley, New York) at angular velocities of 30, 60, 120º/second revealed 26-247% deficits in peak torque values of left ankle dorsiflexor muscles when compared with normal normal right ankle values. Isokinetic strengtening program included 5-10 repetetions of reciprocal concentric ankle dorsi- plantar flexions at angular velocities of 30, 60, 90, 120, 180º/sec. A total of 14 exercise sesions were completed in 3 weeks.
Results: At the end of the exercise program 22-106% increases were observed in left ankle dorsiflexor muscle peak torque values with changing angular velocities. These values were comparable with normal right ankle values. Walking pain score decreased to 4 from 8 (VAS) and stair- climbing pain decreased to 2 from 6 after rehabilitation. Although the patient reported a very limited walking distance (50 m) before the isokinetic exercises program, she was able to walk 2 km at the end of the program.
Conclusions: Isokinetic strengthening program is an effective treatment choice for ankle dorsiflexor muscle weakness and related difficulty of walking developed after ankle fracture.

PP130

OUTCOMES AFTER SURGERY FOR THORACIC OUTLET SYNDROME

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Objectives: To compare the clinical manifestations of the patients before and after surgery due to surgery for decompression of the brachial plexus.
Methods: During 1997-2002 35 patients were operated with the diagnosis of TOS,15 of them were regularly followed up by physical medicine and rehabilitation department. All patients were encouraged for exercise program for at least 3 months after the surgery.Physical examination, which comprised provocative maneuvers Adson's, abduction-eversion maneuvers, hyperabduction tests were performed. Range of motion of the upper extremity were measured before and after surgery. After surgery patients and doctor global assessements,visual analog scale (VAS),drug usage, duration needed to full time working was recorded.
Results: 15 patients after an average follow up 28 months were examined. Eighty-five percent of the patients had complete relief of the symptoms, 12% were satisfied with their operative outcome. However 3% patients were remained on medication and were disabled.
Conclusions: Patients who are encouraged for physical exercises starting from early postoperative period have satisfactory results after surgical treatment of thoracic outlet syndrome.

PP131

THE EFFICACY OF CONSERVATIVE TREATMENT IN PATIENTS WITH FULL THICKNESS ROTATOR CUFF TEARS

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Objectives: Full thickness rotator cuff tears are one of the most common musculoskeletal problems, which cause shoulder pain and loss of function. Although too many studies report about surgical results of rotator cuff tears in the literature, there are few studies about the efficacy of conservative treatment in patients with symptomatic full thickness tears. The aim of this study is to investigate the efficacy of conservative treatment by using objective and subjective measurements.

Methods: Twenty patients with full thickness rotator cuff tears diagnosed by physical examination and MRI were evaluated. A conservative treatment program was performed with physical therapy agents, stretching and strengthening exercises. Shoulder function and pain were assessed by Constant Score and the shoulder index of the American Shoulder and Elbow Surgeons (ASES) and quality of life was evaluated by Short Form -36 (SF-36) questionnaire before and after treatment. Shoulder abductor, external and internal rotator muscle strengths were evaluated with isokinetic dynamometer at 60 °/sec and 180°/sec angular velocities after 10 ml 1% lidocain injection before treatment and sixth months after treatment.

Results: Seven men and 13 women with an average age of 61 years (53-68) were included in the study. Duration of symptoms was 9,2 ± 10,5 (2-42) months. Statistically significant improvements in all parameters (ASESS, Constant scores, SF-36 questionnaire and shoulder range of motion) were obtained ($p<0.05$). Also isokinetic muscle strength of shoulder abductors, external and internal rotators increased significantly at the end of the treatment ($p<0.05$).

Conclusions: Conservative treatment improves not only pain, function and quality of life but also isokinetic muscle strength in patients with full thickness rotator cuff tears.

PP132

OUTCOME OF OPEN ANTERIOR STABILIZATION AND POSTOPERATIVE REHABILITATION IN RECURREN SHOULDER INSTABILITY

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Objectives: The mobility, stability, muscle strength and balance are the factors determining the outcome of the treatment in recurrent anterior glenohumeral instability. Generally the patient requires surgical repair which a variety of alternatives exists nowadays. The aim of this study is to evaluate the function, mobility, muscle strength and balance of the shoulder after open repair of Bankart lesion and capsular shift procedures.

Methods: A total of 33 patients treated with open surgical repair of Bankart lesion and capsular shift procedure for recurrent anterior shoulder instability were included in the study. Eleven patients who were followed up at least for six months completed the study. After the surgical procedure all patients participated at the same accelerated rehabilitation program designed by Willk and Andrews. Isokinetic external rotation (ER) and internal rotation (IR) strengths were evaluated at the velocities of 60 and 180 degrees/second. Range of motion was measured with a goniometer and patients were also evaluated according to the Rowe score.

Results: Mean age of 11 patients (3 female, 8 male) was 26.72 years and the mean follow up period was 11.09±6.34 months. None of our patients had an episode of dislocation or subluxation in the postoperative period. There was a statistically significant improvement in Rowe scores after operation and rehabilitation ($p=0.003$). No significant difference was observed in shoulder range of motion between preoperative and postoperative measurements ($p>0.05$) Postoperative strength of the involved shoulder reached 84.5% and 92.1% of the uninvolved shoulder for ER and IR respectively at 60 degrees/second and 89.6% and 92.1% for 180 degrees/second. The ER/IR ratios did not differ significantly between the involved and uninvolved shoulders.

Conclusions: Open surgical repair of Bankart lesion and capsular shift procedure provides not only stability without loss of mobility but also normal shoulder muscle strength and balance.

PP133

EFFECTIVENESS OF PHYSICAL THERAPY AND REHABILITATION ON OBESE AND NON-OBESE PATIENTS WITH GONARTHROSIS.

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Objectives: Osteoarthritis of the knee is an important and very common problem that affects especially old and obese people. Obesity can be defined as an increased body mass index. Studies reported that gonarthrosis is seen more in obese people than non-obese. The purpose of this study is to compare the effectiveness of physical therapy and rehabilitation (PTR) on obese and non-obese patients with knee osteoarthritis.

Methods: We included 27 patients (18 women and 9 men) and aged from 40 to 75 years with Kellgren and Lawrence grade II or grade III knee osteoarthritis in our study. Patients were divided into two groups as obese and non-obese and were treated with physical therapy (ultrasound, infrared, TENS and isometric exercises) for 10 sessions. Obesity is accepted if body mass index is above 30. Fifteen meter walking time, 10-stair walking time, visual analogue scale (VAS) and WOMAC have been recorded before, after and at the first month of the therapy.

Results: All parameters showed statistically significant improvement within groups ($p<0.05$). Improvement of fifteen meter walking time, 10-stair walking time and VAS were statistically significant between groups in favor of non-obese group ($p<0.05$). WOMAC was not statistically significant between the groups ($p>0.05$).

Conclusion: Obesity can be considered as an important factor, which can influence the course of PTR. In addition to PTR, to lose weight should definitely be advised to obese patients with knee osteoarthritis.

PP134

THE EFFECT OF METABOLIC SYNDROME ON KNEE OSTEOARTHRITIS

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Objectives: Metabolic Syndrome (MS) has become a major public problem in developed and developing countries. Osteoarthritis (OA) is the most common form of arthritis in older adults. The knee and hip are two commonly affected sites. Risk factor for development of knee OA include previous trauma, obesity, a generalize OA, distal

femoral dysplasia, female gender and prepetitive occupational knee bending. In this study, we aimed to define the role of MS on knee OA in male and female.

Material and methods: The OA criteria which is devised by American Collage of Rheumatology was used to categorize the patients admitted to outpatient clinics of internal medicine and physical treatment and rehabilitation departments.One hundered patients with knee OA (83 female, 17 male) and 72 patients with control groups (51 female, 21 male) were involved to our study. We examined them according to National Cholesterol Education Study Program – Adult Treatment Panel (NCEP-ATP III) guideline for the presence of MS.

Results: In the study group MS was present 72,3% in women and 66,7% in men. In control group was 41,2 % and 70,6 % respectively.

	Study group, MS(+)	Study group, MS(-)	Control group,MS(+)	Control group,MS(-)	P
Women (n)	60	23	21	30	<0,001
Men (n)	12	5	14	7	>0,05

OA positive woman had higher frequency of MS compared to OA(-) women (p<0,001). In men MS did not affect the frequency of knee OA (p>0,005).

Conclusion: We showed that MS frequency was higer in women patients with OA but not in men with OA. In order to prevent morbidity in woman from OA, life style change modalities to prevent MS are required.

PP135

CLINICAL EFFICACY OF PULSED ELECTROMAGNETIC FIELD THERAPY IN KNEE OSTEOARTHRITIS

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Objectives: Osteoarthritis(OA) is the most common disorder of musculoskeletal system in population over 50 years old. Pulsed electromagnetic field therapy (PEFT) has been used in treatment of knee OA. The aim of our study was to investigate the effect of PEFT in patients with symptomatic knee OA for clinical and functional outcome evaluated by Lequesne and WOMAC OA indices.

Materials and methods: Twenty- four patients (mean age 61,83±11,11; 20 women, 4 men) who were diagnosed as primary knee OA according to ACR criteria were included into study. Ten of patients were in Kellgren radiological stage 2 and 14 patients were in stage 3. Patients who had flexion contracture more than 10º and valgus-varus more than 15º were excluded. BTL-09 electromagnetic field device was used as 12 mT, 30 minutes duration for 15 daily sessions to the affected knees. All the patients also performed the same isometric knee exercise program. Patients were not under anti-inflammatory medication within this period. Lequesne and WOMAC OA indices were recorded before and after treatment program.

Results: Lequesne index was reduced from 13,54±4,21 to 10,96±4,42 significantly(p=0,001). General WOMAC OA index was reduced from 52,04±21,22 to 32,59±6,04, (p=0,000); pain subscale of WOMAC from 44,33±7,37 to 25,72±13,67, (p=0,000) respectively. Whole patients tolerated the treatment without any side effect.

Conclusions: In conservative treatment of knee OA, PEFT combined with isometric exercises improves the clinical and functional outcome. We suggest PEFT as a beneficial physical treatment modality in knee OA.

PP136

RE-TEST RELIABILITY OF STATIC AND DYNAMIC BALANCE TESTS IN PATIENTS WITH OSTEOARTHRITIS AND HEALTHY SUBJECTS

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Objectives: The aim of this study was to evaluate the test-retest reliability of balance measurements in a population of patients with osteoarthritis of the knees, lumbar spondylosis, and a control group of healthy subjects. Another goal was to find out, if any, differences of balance performance between patient groups and a control group.

Methods: Ten patients with osteoarthritis of the knees (Group 1), 10 patients with lumbar spondylosis (Group 2) and a control group of 10 healthy subjects (Group 3) were included in the study. A balance platform designed both for training and functional testing of balance ability (KAT 2000, Breg, Vista, CA) was used to assess balance abilities of the subjects. The balance performance task consisted of a 'two-legs static' and a 'two-legs dynamic' test. A retest was performed 30 minutes after the first test.

Results: Intraclass correlation coefficients for the static and dynamic tests were 0.23 and 0.55 respectively when evaluated for all 3 groups. For Group 1, the respective coefficients were 0.17 and 0.18, for Group 2, the coefficients were 0.09 and 0.41, and for Group 3, they were 0.40 and 0.79. The results of static and dynamic tests were not different between the disease and control groups.

Conclusions: The use of KAT 2000 to assess the balance ability (both static and dynamic) is not a reliable method in patients with osteoarthritis of the knees. For lumbar spondylosis patients, dynamic testing is fairly reliable while static testing is not reliable. Static testing is fairly and dynamic testing is excellently reliable in normal subjects.

PP137

EFFICACY AND SAFETY OF ULTRASOUND GUIDED INTRAARTICULAR INJECTIONS OF HYLAN G-F 20 IN PATIENTS WITH HIP OSTEOARTHRITIS: A DIFFERENT TECHNIQUE

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Objectives: Most of the published literature on hylan G-F 20 has focused its use in osteoarthritis (OA) of the knee joint. The literature on its use in OA of the hip joint has been sparse. The aim of the study, therefore, was to evaluate the efficacy of hylan G-F (Synvisc) in the treatment of osteoarthritis (OA) of the hip joint.

Methods: Twenty-seven patients (32 hips) with hip joint OA were enrolled in an open-label, prospective study. Demographics included 11 men and 16 women, 12 of whom had mild to moderate OA and 15 of whom had severe hip OA. USG-guided hyaluronic acid (HA) were administered to the affected hip from the lateral aspect of the joint at 1 week intervals, with a total of 3 treatments. The distance between the collum of the femur and the joint capsule was measured by USG before, during the injection in the joint and after. The longest distance from the capsule to femur was accepted. The clinical assesment included visual numeric pain score (VAS), Lequesne index, range of motion of hip joint, Short-form 36 (SF-36),

and use of paracetamol and/ or NSAIDS ($p < 0.001$). All patients were evaluated at preinjection and at 2, 6, 12 weeks.

Results: When compared with the preinjection values, there was a statistically significant reduction in the VAS, Lequesne index and increase in active ROM of hip joint at 6 and 12 weeks. Also there was a clear improvement in the quality of life score at the end of the 12 weeks. The percentages of drug use were decreased to %25.9.

Conclusions: Useful effects recorded in the parameters as a result of the HA treatment are promising for us. HA treatment may offer a potential therapeutic adjunct to current therapies of osteoarthritic hip in the future.

PP138

FREQUENCY , CHARACTERISTICS AND RISK FACTORS OF FALLING IN WOMEN WITH KNEE OSTEOARTHRITIS

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Objectives: The aim of our study is to estimate the frequency and features of falling down in knee osteoarthritis (OA) and put forward the risk factors in falling.

Methods: In this prospective study, 101 women with knee osteoarthritis who applied to our outpatient clinic were evaluated. After the physical examination , Kellgren scoring was used in radiographic assesment and WOMAC index was used for functional evaluation. The statistics were done by Multiple Regresion Analysis and Student's - t test.

Results: The mean age of patients were 63,26+9,67 years. The ratio of patients who had fallen in the recent year was %35 .19 patients had fallen outdoor and majority of them had fallen before noon. 24 had fallen only once in the recent year.Most of them fell in spring and summer.%53 of all patients were hypertensive , %10 had vertigo,%19 had osteoporosis and %22 used glasses. None of the patients had any fracture after falling. 80% of all the patients had radiographically grade 3-4 knee OA Stand up- walking test was normal in%20 of the patients. Age , weight , stand up - walking test, presence of deformity , radiographic severity of knee OA did not effect the frequency of falling($p>0.05$). Neither WOMAC total pain score nor WOMAC total physical function score had a correlation with frequency of falling .The severity of knee OA had positive correlation between WOMAC pain and WOMAC functional scores.($p<0.05$)

Conclusions: Knee OA is a risk factor for falling in older population, and careful evaluation is required.

PP139

CO-EXISTENCE OF SHORT FOURTH METACARPALS AND DIABETES MELLITUS WITH EARLY BEGINING OSTEOARTHRITIS

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Objectives: Osteoarthritis (OA) is characterized by degeneration of joint cartilage with age and causes disability.There are some risk factors of OA like obesity, hereditary, hypermobility, trauma, diet, diabetes mellitus and hypertension. Here, we would like to present a 36 year old women who admitted to our outpatient department because of pain in the first interphalangeal joint of right hand and on the dorsum of the right foot for 6 months.

Methods: She did not define any swelling, warmth or morning stiffness in the hands or feet.On examination, she had short fourth metacarpals bilaterally, Heberden nodule on the right interphalangeal joint. She had tenderness on this joint. She did not have any range of motion limitation in the hands and feet. Her neurological examination was normal. Our patient was the second daughter of unrelated parents. Her family history revealed that her mother, her sister, and aunt also had short fourth metacarpals. In her routine labiratory analysis, fasting plasma glucose was increased(141,9 mg/dl). Anteroposterior hand X ray demonsrated bilateral short fourth metacarpals, minimal sclerosis and narrowing in the first interphalangeal joint. The lateral right foot radiograph revealed narrowing and spur formation in tarsometatarsal joint. The patient was consulted to the endocrinology department and she was diagnosed as diabetes mellitus. Oral antidiabetic drug treatment was recommended.

Results: The presence of short fourth metacarpals led us to check the other disorders known with this congenital abnormality. Lumbosacral radiographs revealed increased sclerosis on end plates of T12-L1, and L2-3 vertabra, decreased lumbar lordosis. Lumbosacral MRI revealed that there were small degeneratif schmorl nodules on lumbar and inferior thoracal vertabrae and there was grade 1 degeneration on L5-S1 disc and grade 2-3 degeneration on T12-L1 disc.There were T12-L1,L1-L2,L3-L4 medial disc bulgings and L2-L3 medial small protrusion, L4-L5 right foramen, L5-S1 medial left paramedian disc protrusions and at this level spinal stenosis. Hormone profile (thyroid, parathroid, sex hormones, etc..) were in normal ranges.Analysing the bone mineral density using DEXA, T score -1.17 in AP spine and -0.65 in femur neck was detected.

Conclusions: In this report we would like to emphasize co-existence of the short fourth metacarpals and DM and related early beginning of osteoarthritis.

PP140

CHARACTERIZATION OF THE RELATIONSHIP BETWEEN CARPAL TUNNEL SYNDROME AND MATERNAL HORMONE IN PREGNANCY.

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Objectives: To evaluate carpal tunnel syndrome during pregnancy and to corralate changes with serum relaxin levels in the first and third trimester.

Methods: 50 women with first-trimester singleton gestations consented to participate in this longitudinal observational study.Pregnancies were evaluated EMG,serum relaxin levels,subjective joint complaints,phalen test,tinel test,numbness,parestesia in the first and third trimester.Serum relaxin levels were measured using a human relaxin spesific enzyme-linked immunosorbent assay.

Results: Although carpal tunnel syndrome increases the third trimester, relaxin levels continued to decrease throughout pregnancy the difference observed between first and third trimester. The results were significant statistically,compared the median of relaxin values(pg/ml).p<0,01 The existence of Phalen test,tinel test positiveness,numbness and parestesia was significant in the third trimester when compared in the first trimester.p<0,05.But the positive correlation could not be found between the change in the relaxin level and carpal tunnel syndrome.p>0,05.

Conclusions: Carpal tunnel syndrome increases during pregnancy ,however ,these changes do not correlate with maternal relaxin level.

PP141

COMPARISON OF BALNEOTHERAPY, PELOIDOTHERAPY AND HOT PACK IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objectives: Knee osteoarthritis (OA) is a common , chronic degenerative disorder.There are various treatment modalities. This study was plannned to investigate the efficacy of balneotherapy, peloidotherapy and application of hot pack in patients with knee OA.

Methods: A total of 65 patients with knee OA were included in the study. Their ages ranged between 39-78. The patients were separated into three groups. Group 1(n=24) received balneotherapy, group 2 (n=21) received peloidotherapy and group 3 (n=20) had hot-pack application for 20 min.duration , once a day, five times per week and a total of 10 session. Patients were assessed according to pain and functional capacity. Pain was assessed by using Visuel Analogue Scale (VAS) and WOMAC pain scale(0-4 likert scale). VAS was used for measuring pain at night, while walking and at rest position. Patients' and physician's global assessment were evaluated by using 0-4 likert scale. Functional capacity was assessed by using WOMAC functional capacity and WOMAC global index. The maximum distance that patient can walk without pain and the duration of a 100 meter walking distance were also evaluated. The assessment parameters were evaluated before and after one month.

Results: In group 1, there were statistically significant improvement in the maximum walking distance and VAS scores (while walking) (p<0.001). WOMAC pain scores were also found to be decreased in balneotherapy group. Patients who received peloidotherapy had no improvement in pain and functional capacity index parameters (p>0.05). In group 3, there were statistically significant decrease in WOMAC pain score (p<0.001) and WOMAC global index (p<0.05). Also physician's global assessment was found to be improved for all three groups (p<0.001).

Conclusions: As a result balneotherapy and heat therapy were effective and may be an alternative method in treating patients with knee OA.

PP142

EFFICACY OF INTRA-ARTICULAR HIP INJECTION OF HYLAN G-F 20 ON PAIN AND FUNCTIONAL STATUS IN PATIENTS WITH HIP OSTEOARTHRITIS

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Objectives: We studied the efficacy of intra-articular Hylan G-F 20 (a derivate of Hyaluronan) on pain and functional status in patients with symptomatic hip osteoarthritis.

Methods: 17 patients with grade II (n= 6) and grade III (n= 14) primary hip osteoarthritis (OA) were included in the study. Patients received an intra-articulary Hylan G-F 20 injection three times at weekly intervals: 14 patients in one hip and 3 patients in both hips. Visual Analog Scale (VAS) was used to assess severity of pain. Functional status was assessed with WOMAC. Range of Motion (ROM) was passively measured using goniometry before and after one week of injection. In addition, we also assessed walking time and distance without pain and difficulty in daily living activities of the patients.

Results: The mean age of the patients was 64.5±8.67 years. VAS scores in activity and rest were decreased from 6.88±0.99 to 3.35±1.36 and 3.11± 1.21 to 1.47±0.94 respectively after the injections (p<0.05). WOMAC pain, stiffness and physical function parameters were also significantly decreased (p<0.05). Walking time, distance without pain and measurement of difficulty in daily living activities were significantly improved (p<0.05); however there was no significant difference in ROM values before and after injection (p>0.05).

Conclusions: Intra-articular administration of Hylan G-F 20 has significant benefit on of the patients' pain and functional status. Further studies are required to improve the clinical manifestations of hip including pain and functional impairment and to assess its duration, these studies should involve long term monitoring of the patients in case of recurrence of osteoarthritis.

PP143

EFFECT OF ELASTIC KNEE SUPPORT ON STATIC AND DYNAMIC BALANCE IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objectives: To evaluate the effect of elastic knee support on static and dynamic balance in patients with knee osteoarthritis.

Methods: Thirty nine patients (30 women, 9 men; mean age 55.2, range 35-78 years) with symptomatic and radiographic knee osteoarthritis were included in the study. A clinical test for dynamic balance (timed up and go test) and a quantitative test for static balance using Kinesthetic Ability Trainer (KAT-3000) were performed. Patients were divided into two groups. Study group (19 patients) were retested with elastic knee support and control group (20 patients) were retested without knee support 15 minutes after the first assessment.

Results: In the control group, mean baseline static balance index and dynamic balance score (354.6 ±155.1, 8.4 ±2.5 sec respectively) did not differ significantly (p>0.05) in the second assessment (342.9 ± 102.9, 8.1 ± 2.3 sec respectively). In the study group, mean baseline statical balance index and dynamic balance score (427.3 ± 119.9, 9.6 ± 4.9 sec respectively) were significantly decreased in the second assessment with knee support (339.5 ±118.3, 8.4 ± 3.7 sec, p<0.001, p<0.05 respectively) .

Conclusions: Elastic knee support improved both static and dynamic balance in patients with knee osteoarthritis.

PP144

PATEOLLOFEMORAL PAIN SYNDROME: PREVALENCE AND CLINICAL CHARACTERISTICS

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Objectives: To investigate the prevalence and clinical characteristics of subjects with patellofemoral pain syndrome (PFPS), and to interfere the findings in preventive and therapeutic rehabilitation protocols.
Methods: One hundred subjects (75 female, 25 male) over 20 years of age, with knee pain and no history of known malignancy, metabolic, inflammatory or neurological diseases were enrolled into this cross-sectional study. Anthropometric data and patient history were recorded, and physical and radiographic examinations of the knee joint were performed. Thirty- nine subjects were diagnosed as PFPS according to PFPS Criteria. Pain characteristics, functional capacity (Lysholm Scale), lateral shift and tilt of the patella, patellar crepitation, pain in patellar comprehension and apprehension, hamstring tightness, Q-and A- angle measurements, limitation of range of motion, knee effusion, foot pronation, lower-extremity malalignment were documented. Besides descriptive analysis, correlation between clinical characteristics and functional capacity was also investigated.
Results: Prevalence of PFPS was found to be 39% among the subjects with knee pain. Mean±SD of age, pain VAS score and Lysholm Score was 33.1±8.5 years, 3.7±1.3, and 80.1±13.7, respectively. A sharp and activity induced pain was described in 82% of the subjects. Retropatellar crepitation was found in 70%, while provoked anterior knee pain was observed in 45% of the subjects. Mean±SD of Q- and A- angle measurements were 12.2±3.4 and 14.2±3.6 degrees, respectively. Patellar comprehension test was painful in 77%, patellar tilt was positive in 15%, patellar displacement was positive in 8% and Theatre sign was positive in 92% of the subjects. Hamstrings were tight in 28% of the subjects. There was not a significant correlation between Lysholm score and any of the assessed clinical characteristics.
Conclusions: Subjects with PFPS do not fit into a single form but rather require an evaluation-based classification and specific interventional pattern. Knowledge of the biomechanical factors contributing to patellofemoral joint pain may improve treatment techniques and guide development of prevention strategies.

PP145
RISK FACTORS IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Objectives: This study aimed to evaluate the risk factors in our patients with knee osteoarthritis (OA) and to determine whether they differ from known risk factors.
Methods: One hundred twenty five female patients, mean age 65.3±6.9 years, (range 47-88) with knee osteoarthritis and 22 healthy women, mean age 56.6±9.6 years (range 45-78), volunteered in the study. Medical history including smoking habits, menapause periods, performing regular exercises, performing Islamic rites (namaz), trauma history, surgery history; regular nonsteroidal anti-inflammatory drug (NSAID) consumption; family history about osteoarthritis and occupation of all subjects were recorded. Complete blood counts (CBC), erithrocyte sedimentation rates (ESR), C-reactive protein (CRP) and rheumatoid factor (RF) levels and routine biochemical analysis were performed. Body mass index (BMI) was calculated using the formula "BMI = weight/height²". Physical examinations of all subjects were made and presence of heberden nodules were investigated. Radiologic examinations of hands, knees and lumbal vertebraes were obtained. Staging of osteoarthritis was made according to the radiologic criteria developed by Kellgren and Lawrence. Presence of hand and lumbal vertebrae osteoarthritis was determined radiologically. Pain and functional loss were evaluated using WOMAC (scored between 0-96) and Lequesne (scored between 0-24) indexes.
Results: BMI were found to be significantly higher in patient group than controls ($p<0.001$). A positive correlation was found between stage of knee OA and presence of hand OA ($p<0.001$). Menopause period of patients were longer when compared with controls ($p<0.01$). Menopause period was also correlated with stage of knee OA ($p<0.05$). Smoking ratio was lower in patient group than controls (14,96%, 50% respectively). A significant positive relation was found between presence of ligamantous laxity and stage of knee OA ($p<0.05$). There wasn't any relation between patient and control groups regarding to the Diabetes Mellitus (DM) ($p>0.05$); but stage of knee OA positively correlated with DM ($p<0.05$). NSAID consumption was significantly lower in patient group than in controls ($p<0.01$). NSAID consumption was also negatively correlated with the stage of knee OA ($p<0.05$). Uric acid and CRP levels were significantly higher ($p<0.05$) in patient group when compared with control group. There was no relation between WOMAC index and radiologic knee OA; but a positive relation between BMI and WOMAC ($p<0.05$) and Lequesne ($p<0.01$) indexes were found.
Conclusions: According to our results; age, gender, menopause and genetic susceptibility seemed to have more effects on incidence of knee OA while DM and obesity, seemed to have more effects on progression. We assumed that ligamentous laxity was a result of knee OA. Smoking may have protective effects on OA; but this claim has to be proven with further studies containing larger control groups. Regular NSAID consumption seemed to be slowing down the progression of OA. A significant concurrence of hand and knee OA was observed. As CRP values of patients were significantly higher than controls; we couldn't deny a chronic inflammatory response in OA. DM seemed to be accelerating the radiographic progression of OA. Our results also supported the opinion that high serum uric acid levels play role especially in generalised OA's multifactorial etiology.

PP146
THE USE OF BRACING FOR ELDERLY PATIENTS WITH KNEE OSTEOARTHRITIS

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Objectives: Osteoarthritis is a common cause of disability in the elderly group. A variety of treatment options exist for patients with osteoarthritis of the knee. This study is designed for evaluation of braces' usage in elderly patients with knee osteoarthritis.
Methods: 30 patients with knee osteoarthritis who had prescribed knee braces, recruited from the office of health reports with randomization between the reports of last three years (approximately 100 patients in a year). All patients were under government health insurance. Investigators reached to 24 of them and asked questions about demographic data (gender, age, illness, leg side, education etc.) and use of brace (name of brace, date of brace use of in outpatient, comforts, is it suit to knee, effects on psychology, controls of brace, efectiveness, safety, time of use, additional orthesis etc…) on phone.
Results: 3 male and 21 female with mean age; 64,35 ± 4,86 years, replied to our question form. Nearly 58 % of patients (n=14) did not use knee brace more than 2 times (totally 2 hour) after braces were adviced. Most frequent causes of unused brace were diffuculties of

wearing and discomfort. 10 persons worn them more than one mounth. All patients were prescribed for usage of cane, usage of cane were still continue in 17 patients, the cause of unused canes was especially esthetic reason.

Conclusions: In our sample, ratio of unused brace is high. It may be due to age of our sample. Although, varies of braces may improve gait and pain in knee osteoarthritis, elder persons may prefer to unused them. In the elderly, individuals may prefer safe and easy use, instead of effectiveness. Elderly population adopt to new situations with difficulty. Loss of prorioception and speed are important factors that may affects usage of brace. Selection of brace's type, education, acceptance, comfort, psychology, controls are important factors for success in the elderly.

PP147

SHOULDER FUNCTION AFTER FUNCTIONAL NECK DISSECTION FOR TREATMENT OF HEAD AND NECK CANCER

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Neck metastasis is the most important prognostic indicator in patients with head and neck cancer. Several types of neck dissections have been described to control the disease in the lymph nodes and channels of the neck. Radical neck dissection (RND) was first described by Crile in 1906, in which spinal accessory nerve is sacrified. However this results in severe dysfunction of the shoulder. In functional neck dissection (FND), spinal accessory nerve is preserved and it is superior from RND in the aspect of shoulder function. In this prospective study, we aimed to measure shoulder disability and function in patients who underwent FND procedure by using objective techniques. The study group consists of 21 patients and 42 neck, 1 woman and 20 men (between 46 and 74, mean age: 58.8). All patients underwent bilateral FND. The range of motion of each shoulder was maesured with electronic inclinometer (Cybex ®) by Physical Medicine and Rehabilitation specialist preoperatively and at postoperative 1st, 3rd, 6th, and18th months. Abduction reduced significantly only at first postoperative month with regard to preopreative measures (p= 0.039) due to surgical trauma. In the following examinations abduction improved. Other shoulder movements were not affected after surgery. As a result FND is found to be a safe procedure in the aspect of shoulder function.

PP148

CANCER REHABILITATION SERVICES. A CHALLENGE IN ONCOLOGY CARE

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Objectives: Cancer patient experiences varied and individualized needs that require the attention of an efficient multidisciplinary team of health care professionals. This team approach helps patients and family adapt to their situation whether the changes are temporary or permanent. Since cancer rehabilitation blends acute and chronic care, the team needs knowledge of both oncology and rehabilitation principles and practices. Availability and expertise of rehabilitation team ensures to patients the best possible quality of life throughout the continuum of care.

Methods: This presentation aims to give an overview of inpatient. Rehabilitation Model applied over the last years in Hygeia Hospital, a general private hospital in Athens with extended Oncology services which simply refer the patients to the general rehabilitation resources available in the hospital. This model serves both medical and surgical oncology patients during hospitalization, and offers flexibility in serving more patients. Although it represents a viable starting point, it is difficult for the team to evolve further since interdisciplinary communication is not formalized, it does not foster team relationships and interdisciplinary communication.

Results: Rehabilitation principals applied in the PRM department of Hygeia Hospital focus on practical day-to-day issues, such as: a) Maximizing strength to compensate for limitations b) Teaching patient skills to foster independence c) Facilitating adjustment to losses whether actual or potential, and d) Addressing preventive issues for those at high risk for complications or disability.

Conclusions: Recently for our rehabilitation program we are exploring new ways to form partnerships with oncology programs, especially in the outpatient setting. Clearly this is a more viable option, since the majority of cancer care is outpatient.

PP149

DEVELOPMENT OF MUSCULOSKELETAL COMPLAINTS AND FUNCTIONAL DISABILITIES IN PATIENTS WITH LARYNGEAL CARCINOMA AFTER LARYNGECTOMY AND PARTIAL NECK DISSECTION

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Objectives: The purpose of this study was to determine the musculoskeletal complaints and functional disabilities of male subjects who had undergone laryngectomy and partial neck dissection(LPND) by comparing them with healthy age-matched male subjects.

Methods: Twenty patients who had undergone LPND more than 3 months ago and 20 healthy age-matched subjects were included in the study. The subjects were asked for neck and shoulder pain, pain or numbness in the arm, neuropathic pain symptoms. They were asked to answer Northwick Park Neck Pain Questionnaire(NPNPQ) and Neck Pain and Disability Scale(NPDS). Range of motion(ROM) of the neck of the subjects were measured by goniometry and pain at each direction of movement of the neck were determined. ROM of the shoulder of the subjects were assessed as positive or negative limitation comparing the goniometric measurements with normal values.

Results: Mean ages of the LPND and control groups were 60.05+9.78 and 62.95+ 9.53 years ($p>0.05$). Neck pain ($p=0.002$) and pain at lateral flexion and rotation of the neck were significantly increased in the LPND group compared with the control group($p=0.001$, $p=0.04$). A significant reduction in goniometric measurements of the neck and shoulder were observed (for each direction of movement of the neck $p<0.05$, $p=0.009$). Mean NPNPQ and NPDS scores were 16.35+16.86 and 12.50+16.79 for LPND group, 8.36+4.9 and 1.9+5.11 for the control group, respectively. LPND group had statistically significant higher NPDS scores compared with the control group($p=0.00$). There was statistically significant correlation between NPNPQ and NPDS scores of the groups ($p=0.00$).

Conclusions: A significant increase in neck pain and stiffness and a significant increase in functional disability were observed in the LPND group compared with the age matched healthy subjects.

PP150

BRACHIAL PLEXUS METASTASIS SECONDARY TO BREAST CANCER (REPORT OF TWO CASES)

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Objectives: When symptomatic brachial plexopathy occurs in a patient with breast carcinoma, differential diagnose of metastasis or complication of radiotherapy must be considered.

Methods: Hereby, we present two cases of brachial plexus metastasis following treatment for breast cancer. There was no history of radiation therapy before. Both patients had intractable pain, progressive weakness and hypoestesia in the upper extremity. EMG findings revealed plexopathy, MRI of brachial plexus confirmed metastasis.

Results: After radiotherapy, one of the patient had full and the other one had partial recovery.

Conclusions: If symptomatic brachial plexopathy occurs in a patient with breast carcinoma, metastasis must not be overlooked.

PP151

DISABILITY, DEPRESSION AND QUALITY OF LIFE AMONG OLDER HEMODIALYSIS PATIENTS

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Objectives: To compare disability, depression, and health related quality of life among older dialysis patients and controls.

Methods: One hundred nine renal failure patients on hemodialysis and 40 controls included in study. Short Form-36, Symptom Checklist 90-R (SCL-90R) and Rivermead Mobility Index were used for assessment.

Results: Dialysis patients, compared with controls, reported significantly more disability ($p<0.05$). These patients had also higher depression scores ($p<0.05$)(Table 1). Dialysis patients reported lower quality of life than did controls ($p<0.05$) (Table 2). Disability and depression were significantly related in the dialysis patients.

Conclusions: Older dialysis patients had lower health related quality of life scores. Physical disabilities in dialysis patients are common and lead to increased frailty and greater dependence on activities of daily living. Exercise should be design for dialysis patients properly. Even minimal attention to improving physical function results in significant benefit.

Table 1: RMI, depression and anxiety level in patients and controls.

	Control n=40	Patients n=109	p
Rivermead mobility index (RMI)	12.5 ± 1.83	9.35 ± 3.44	p<0.05
SCL-90, Depression subscale	0.68 ± 0.39	0.89 ± 0.58	p<0.05
SCL-90, Anxiety subscale	0.56 ± 0.41	0.75 ± 0.59	p<0.05

Table 2: Quality of health (SF-36) in patients and control

	Controls n=40	Patients n=109	P
Physical Functioning (PF)	50. 62 ± 21.96	37.93 ± 29.72	p<0.05
Role-Physical (RP)	56.25 ± 40.33	27.06 ± 36.34	p<0.05
Bodily Pain(BP)	47.90 ± 20.06	57.20 ± 32.63	p<0.05
General health (GH)	47.20 ± 16.18	40.31 ± 25.07	p>0.05
Vitality(VT)	55.12 ± 14.95	45.41 ± 24.85	p<0.05
Social Functioning (SF)	65.21 ± 24.07	62.50 ± 28.86	p>0.05
Role Emotional (RE)	56.66 ± 37.89	29.66 ± 39.89	P<0.05
Mental Health (MH)	64.92 ± 16.47	50.60 ± 21.78	P<0.05
Physical Component Scale (PCS)	50.43 ± 18.69	40.62 ± 23.32	p<0.05
Mental Component Scale (MCS)	60.56 ± 16.47	49.29 ± 19.37	p<0.05

PP152

EFFECT OF STRAIGHT LEG RAISING ON TIBIAL F-WAVE

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Objectives: To investigate the effect of straight leg rising on tibial nerve F-wave latency, chronodispersion and persistence in healthy subjects.

Methods: Thirty-seven healthy volunteers (13 male, 24 female), with a mean age 34.54 ± 9.78 years, were included in the study. Tibial nerve F-wave studies were performed on the right side while subjects were lying in supine position with hip joint in neutral position and after straight leg raising with 90° hip flexion. Minimal latency (Fmin), maximal latency (Fmax), chronodispersion and persistence of F-wave were measured both at neutral position and 90° flexion.

Results: The mean Fmin at neutral position was 43.56 ± 3.91 msec and 44.11 ± 3.73 msec at 90° flexion. The minimal latency of tibial F-wave was significantly increased after straight leg raising ($p=0.026$). The mean Fmax before and after straight leg raising were 48.31 ± 4.40 msec and 48.42 ± 4.02 msec. There was no significant difference in Fmax between two positions. The mean chronodispersion values for neutral position and 90° flexion were 4.85 ± 1.16 msec and 4.31 ± 1.48 msec, respectively. The difference between two positions was statistically significant ($p=0.048$). F-wave persistence varies from 81.25% to 100% (mean 97.64 %) at neutral position and from 93.75% to 100% (mean 99.83%) at 90° flexion.

Conclusions: F-wave studies are routinely performed in nerve conduction studies and in this study we assessed the positional changes of the tibial F-wave and produced a normative data. Knowing the effect of extremity position in nerve conduction studies is important in standardization and might be useful in evaluating some subgroup of patients with neurological problems.

PP153

THE ASSOCIATION OF EMG FINDINGS WITH FUNCTIONAL RECOVERY AND CLINICAL FINDINGS IN PATIENTS WITH TRAUMATIC NERVE INJURIES

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Objectives: To assess the association between EMG findings and hand functions, grip strength, and sensation in patients with traumatic nerve injuries at the wrist level.

Methods: Thirty-eigth peripheral nerves (23 median, 15 ulnar) that have been operated at least 6 months ago were examined. For sensory evaluation monofilament test and 2-point discrimination test were used. Muscle strengths of APB/ADM were tested manually. Sollerman Hand Function Test (SHFT) was used to assess the dexterity of the hand. EMG was carried out in the first week following clinical evaluation.

Results: The mean age of the patients was 27,8±9,9 years. The average interval between the operation and EMG/clinical assessment was 10,8±8,1 months. The mean score of SHFT was 70,6±12,7. Motor nerve conduction velocities (MNCV) were normal in 13 and decreased in 22 patients. In 3 patients no activity could be detected. The average score of SHFT was 67 in patients with normal MNCV, 68 in patients with decreased velocities and 74 in patients with no activity. Muscle strength was above 3 in 68%of the patients with normal MNCV, in 46.2%of the patients with decreased MNCV, and in 33,3%of the patients with no response. Four patients had normal, 18 patients had decreased sensory nerve conduction velocities (SNCV) in sensibility evaluation.. Sixteen patients had no activity. Mean SHFT score was 75 in patients with normal SNCV, 69 in patients with decreased SNCV and 65 in those with no activity. Those at ≥S3 level, 75%had normal SNCV, 33%had decreased SNCV and in18%of the patients EMG activity could not be detected.

Conclusions: In patients with traumatic nerve injuries at the wrist level, SHFT score is almost identical in patients who have recovered poorly or well as judged by EMG. Muscle test and sensibility evaluation are in good relation with MNCV and SNCV after a follow-up period of 10,8 months.

PP154

THE COMPARISON OF ELECTROPHYSIOLOGICAL METHODS IN PATIENTS WITH TARSAL TUNNEL SYNDROME

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Objectives: Tarsal tunnel syndrome (TTS) is considered to be a compressive neuropathy of posterior tibial nerve and its branches at the level of ankle or more distally. Patients with TTS usually describe pain behind the medial malleolus and paresthetic findings in the distribution of medial and lateral plantar nerves. The aim of his study is to evaluate the diagnostic value of the surface stimulation technique and compare to the near nerve technique for tibial nerve and its branches.

Methods: In the study group 24 extremities of 20 patients were examined. We stimulated 21 extremities in control group. In the study group 11 extremities were studied by using near nerve needle technique. Motor and mixed nerve conduction studies were performed for posterior tibial, peroneal, sural medial plantar and lateral plantar nerves. To perform motor nerve conduction study of posterior tibial nerve, it was stimulated from three points; below and above of medial malleolus that the distance between them was kept constant at 10 cm and popliteal fossa. Medial plantar and lateral plantar nerves were stimulated just behind the medial malleolus and the recording electrodes were placed 14 cm from the stimulating cathode.

Results: In our study group, the latency of the medial plantar nerve and the mixed nerve conduction velocities were prolonged significantly compared to the control group ($p<0.05$, $p<0.0001$). The conduction velocity of the lateral plantar nerve were also delayed significantly ($p<0.0001$). In our study group the latency of the posterior tibial nerve was prolonged significantly when it was compared to the control group ($p<0.05$). The nerve conduction velocity of the posterior tibial nerve was slowed across the tarsal tunnel compared to the control group too ($p<0.0001$). we observed that the near nerve needle technique was no superiority to the surface stimulation technique.

Conclusions: As a result; we suggest that the use of surface stimulation technique of the posterior tibial nerve and its branches is very simple, easy and helpful in the diagnosis of TTS.

PP155

AUTONOMIC AND NEUROPATHIC DYSFUNCTION IN PATIENTS WITH DIABETES MELITUS

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Objectives: Patients with diabetes mellitus (DM) have associted form of neuropathies with different degrees. Aim of this study is to investigate wich form and degree of peripheral neuropathy have diabetic patients with autonomic dysfunction

Methods: We investigate 34 patients wih erectile dysfunction registered with urodinamic study.There were 8 patients with non-insulin dependent DM and 26 patients with insulin dependent DM. We registered sensory and motor nerve conduction. SCV were registered in sural nerve, and MCV on peroneal and tibial nerve.

Results: Average age was 42,2 years, duration of DM were 12,7 years, average of glycemia were 8,0 mmol/l and Hb A1c were 9,3% on the day of investigation. In all patients we registered slowing of SCV average were 30,25 m/s (17,5-40 m/s). In 57% patients we registered slowing in MCV.

Conclusions: In this study we show that autonomic and peripheral neuropathies are associated, especially with sensory dysfunction in diabetic patients.

PP156

BLINK REFLEX AND FACIAL NERVE CONDUCTION STUDIES IN PERIPHERAL FACIAL NERVE PALSY

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Objectives: The study goal was to demonstrate that blink reflex analysis and facial nerve conduction tests correlate with needle EMG findings and clinical evaluation.

Methods: 30 patients (mean age 48±15.87) with peripheral facial nerve palsy (PFP) and a group of 10 age-matched control subjects were evaluated clinically and electrodiagnostically. House Brackmann facial nerve grading system (HB system) was used in clinical evaluation of the patients. Needle EMG was performed on the paretic side in frontalis, orbicularis oculi and orbicularis oris muscles. In the blink reflex study the supraorbital nerve was stimulated bilaterally and the responses (R1, R2 and contrlateral R2 latencies) were recorded from the orbicularis oculi muscle on each side. In facial nerve conduction study the responses of frontalis, orbicularis oculi and orbicularis oris muscles to electrical stimulation

of facial nerve were recorded and the amplitude differences between the pathological and healthy sides were calculated.
Results: In the patients group the mean R1, R2 and contralateral R2 latencies were 11,28±0,94; 34,30±2,86 and 37,73±3,39 for the asymptomatic side and 13,88±1,68; 38,50±4,09 and 35,42±2,85 for the symptomatic side, respectively. Side to side blink reflex latency differences were highly correlated with needle EMG and HB findings ($p<0.001$). Compound muscle action potential amplitudes recorded in frontal, o.oculi and o.oris muscles were lower on the paretic side (0,34µv±0,43; 0,63µv ±0,62; 0,61µv ±0,58) compared to the asymptomatic side (0,85±0,72; 1,53±0,65; 1,60±0,83). The side to side difference in amplitudes of the facial nerve recorded from o. oculi and o.oris muscles were correlated with needle EMG, blink reflex and HB findings ($p<0.05$).
Conclusions: Our findings suggest that blink reflex and facial nerve conduction studies provide valuable information in PFP. These tests can be used as standard electrodiagnostic techniques in addition to needle EMG.

PP157
ELECTROPHYSIOLOGIC EVALUATION OF PATIENTS WITH CARPAL TUNNEL SYNDROME DURING NOCTURNAL PARESTESIA

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Objectives: A hallmark of Carpal Tunnel Syndrome (CTS) is nocturnal pain and parestesia. In this study patients with CTS are evaluated electrophysiologically at night when they waked up with parestesia.
Methods: Ten patients with CTS were evaluated electrophysiologically at night when they waked up with parestesia. Median and ulnar motor distal latancies(MDL), motor conduction velocity(MCV), Compound muscle action potentials amplitudes (CMAP), sensory conduction velocity (SNCV) and amplitudes of sensory nerve action potentials are recorded and were compared with the day-time results. Also ischemia and reperfusion model were used and during ischemia and reperfusion median nerve MDL and CMAP were measured again. Median nerve motor strenght duration time(SDT) constant is recorded at daytime, at night, during at the ischemia and reperfusion too. Six controls were evaluted also in all conditions and results were compared with patient's.
Results: Median nerve MDL's mean were 5,09±1,18 ms at daytime, 5,1±1,15 ms at night, 5,1±1,09 ms at ischemia and 5,31 ±0,94ms at reperfusion condition. Median nerve SNAP amplitudes mean was 12,02±6,88uV at daytime and 10,61±4,25 uV at night. Median nerve SCV were 34,38±8,22 m/s at daytime and 33,2±8,54 m/s at night. Median nerve motor SDT means were 0,518msec at daytime, 0,496msec at night, 0,396msec at the ischemia and 0,487msec at the reperfusion condition. There is no statistical difference between control and study groups for median nerve MDL, SCV, SNAP and median motor SDT constant results.
Conclusions: Although parestesia symptoms of the patients at ischemic condition were the same at the night when they waked up with parestesia, there were no differencies between at night, daytime and other conditions in all parameters .

PP158
THE EFFECTS OF STEROID PHONOPHORESIS AND IONTOPHORESIS ON THE FUNCTIONAL STATUS SCALE (FSS), JEBSEN TAYLOR TEST (JTT) AND ELECTROPHYSIOLOGICAL PARAMETERS IN PATIENTS WITH CARPAL TUNNEL SYNDROME (CTS)

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Objectives: CTS is a common disorder for which various conservative treatment options are available. The objective of this study is to determine the efficacy of the steroid phonophoresis and iontophoresis relieving the symptoms of CTS.
Methods: 34 patients were included in this prospective clinical study. The patients were randomized in two groups. In-group I (n=16), the patients were treated with corticosteroid iontophoresis, in-group II (n=18), the patients were treated with corticosteroid phonophoresis and both of them were treated for three weeks (10 min/3 times a week). All of the patients in the groups were given night splints in neutral position. The symptoms of the patients were evaluated with FSS, the ability of the hand was determined with JTT and the electrophysiological findings were recorded before treatment, at the 1st and the 3rd months.
Results: Totally 34 moderate CTS patients were enrolled in the study and their mean age was 44.18±9.5. Only the results of the dominant hands were evaluated. The FSS scores improved in each group in comparison to 1st and 3rd month results ($p<0.01$). To asses the patients hand function, JTT was performed which consists of seven items.In group I the time required for writing and picking up large objects, in group II the time required for writing and picking up small common objects improved at 1st and 3rd months ($p<0.05$). In group I, sensory conduction velocity of the median nerve, DML (distal motor latency) palm-wrist mixed conduction velocity improved at 3rd month ($p<0.05$). In group II, DML improved at 1st month ($p<0.05$). There was no correlation between the clinical and electrophysiological findings in two group.
Conclusions: We suggested that the FSS and JTT may be of value in clinical or research situations to evaluate the hand function.Steroid phonophoresis and iontophoresis are effective and are proposed treatment alternatives for CTS.

PP159
THE USE OF IONTOPHORESIS AND LOCAL CORTICOSTEROID INJECTIONS IN PATIENTS WITH CARPAL TUNNEL SYNDROME (CTS)

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Objectives: CTS is the most common compression neuropathy of the median nerve at the wrist. The aim of this study is to evaluate the clinical and electrophysiological efficacy of iontophoresis in comparison to local corticostreoid injections in patients with moderate CTS.
Methods: 48 patients were recruited in this prospective clinical study. The patients were randomized in three groups. In-group A, the patients were treated with corticosteroid iontophoresis for 10 min/3 times a week, for three weeks. In-group B, the patients were treated with local betametazone injections at the carpal tunnel. In-group C, the patients were treated with NSAID. All of the patients in the groups were given night splints in neutral position. BSSS (Boston Symptom Severity Scale) was used to evaluate the symptoms of the patients. Grip strength was detected by Jamar hand dynamometer and a pinchmeter was used to measure lateral, palmar and tip pinch

strength. The patients were evaluated before treatment, at the 1st and the 3rd months.

Results: 62% of the patients (mean age 44.05±8.73) had bilateral moderate CTS. Only the results of the dominant hands were evaluated. The BSSS scores improved in each group in comparison to 1st and 3rd month results ($p<0.01$). The lateral pinch strength of the patients' in-group A improved at 3rd month ($p<0.001$), while the palmar pinch of the patients' in-group B improved at 3rd month. In all groups, sensory conduction velocity of the median nerve and DML (distal motor latency) improved at 3rd month ($p<0.05$).

Conclusions: Our results showed us that using night splints alone or adjunct to either corticosteroid ionthophoresis or injections make an improvement in the symptoms and the electrophysiological parameters of the patients. Clearly, improvement in pinch strength was obvious in patients who were treated with either ionthophoresis or injections.

PP160

COMPARISION CLINICAL EXAMINATION AND MRI TO DETECT SYNOVITIS IN RA PATIENTS

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Objective: To compare magnetic resonance imaging (MRI) and clinical examination to detect synovitis in Rheumatoid Arthritis (RA) patients.

Methods: Sixteen patients with RA were assessed acording to Stoke activity index, swollen joint count of hands and wrists (2 wrists, 10 metacarpophalangeal (MCP), 10 proximal interphalangeal (PIP) joints), morning stiffnes, erytrocyte sedimentation rate and C-reactive protein. MRI images of hands and wrists were obtained with an surface coil, on T1 weighted (T1W) spin echo (SE), coronal images before and after gadolinium DTPA, T1W SE axial images with gadolinium DTPA. T2 gradient echo recall coronal and axial sequences.

Results: The swollen joint count was 24/32 wrists, 75/160 MCP, 31/160 PIP on clinical examination and 31/32 wrists, 124/160 MCP, 71/160 PIP on MRI . MRI revealed synovitis significantly more often than clinical examination.

Conclusion: MRI is more sensitive than cilinical examination to detect synovitis of hands and wrists in RA.

PP161

CASE REPORT: A SEVERE OSTEOMALACIA CASE WITH SERONEGATIVE SPONDYLARTHROPATHY FINDINGS

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Osteomalacia (OM) is characterized by inefficiency of newly formed bone matrix mineralization. Diffuse pain in pelvis, vertebral column, costa or extremities, bowing of the long bones, kyphoscoliosis and pelvic abnormalities can be observed. Musculoskeletal findings mimicing proximal myopathy, polymyalgia rheumatica, fibromyalgia, polymyositis, skeletal hyperosteosis, rheumatoid arthritis and ankylosing spondylitis (AS) can be present. Slightly low or normal blood calcium, low blood phosphorus, high alkaline phosphatase are found. Nonspesific bone density loss, pseudofractures are seen in X-ray. Treatment regimen may include calcium, phosphate and vitamin D. Axial osteomalacia is a rare disease which can be confused with AS. Calcified enthesopathies, blurred sacroiliac joint (SIJ) margins and subchondral bone erosions in the symphysis pubis are observed in these patients. Laboratory findings are usually normal. Looser zones may not be seen in X-ray.

The physical examination of a 31 year old female patient who applied with inflammatory lumber pain, pain in arms and hips and restriction of movement for 3 years, revealed pain and restriction in all ranges of movement in the lumber spine. SIJ tests were positive, hip joints were restricted and painful. Chest expansion was decreased. Serum calcium, parathyroid hormone and vitamin D levels were normal while phosphorus was low and alkaline phosphatase was high. Urine phosphorus excretion for 24 hours was low. HLA-B27 was negative. Bone densitometry was concordant with osteoporosis. Grade 1 sacro-ilitis and enthesopathy in the trochanter and calcaneus were observed in X-ray. Scintigraphy revealed increase of osteoblastic activity. A diagnosis of OM depending on hypophosphatemia was made. The definite diagnosis with iliac crest biopsy was severe OM. Treatment was initiated while the patient is still being examined by gastroenter-ologists, for the hypophosphatemia may be gastrointestinal oriented. Conclusively, OM can mimic various musculoskeletal diseases with different clinical and radiological findings leading to a confusion in differential diagnosis.

PP162

IS PRESENCE OF JOINT DEFORMITIES OF RHEUMATOID ARTHRITIS A PREDICTOR FOR CARDIOVASCULAR DISEASES?

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Objectives: Until now the results of the studies about the risk of cardiovascular disease (CVD), an important cause of mortality in rheumatoid arthritis (RA), have not been enclosed. This study was performed to evaluate the clinical and laboratory parameters related to CVD in RA patients.

Methods: The historical data of 188 patients included were evaluated retrospectively. The end points for CVD were myocardial infarct and stroke. Patients either suffer from or don't have CVD were compared by CVD risk factors such as demographic, socio-economical data, habits, duration of disease, hypertension, diabetes mellitus, hyperlipidemia, renal diseases; by baseline therapy agents and use of corticosteroid drugs; functional status (by HAQ); number of swollen and tender joints, pain score (by VAS); morning stiffness; presence of deformities and rheumatic nodules.

Results: When compared by clinical and laboratory parameters of patients with or without CVD; advanced age, presence of hypertension and renal diseases, use of corticosteroid drugs and presence of joint deformity were significantly higher in CVD patients. When those significant variables were assessed by regression analysis, only joint deformity was left aside as independent variable ($P<0.05$).

Conclusion: Our results showed that in remitting and relapsing RA patients, evaluation of only one cross measurement by clinical and laboratory procedures is not sufficient for the determination of CVD risk, and joint deformities that is an indicator of chronic inflammation reflecting the onset of CVD are of more predictive value than other classical risk factors. Therefore we suggest that, we may improve life expectancy and quality of life of the patients by

controlling the intensity of disease in RA patients and by reducing CVD morbidity.

PP163

THE RELATIONSHIP OF HALLUX VALGUS ANGLE AND EROSION IN RHEUMATOID ARTHRITIS

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Objectives: Foot deformities are common features in rheumatoid arthritis (RA). Eighty-nine percent of patients with RA have forefoot involvement. In clinical practise, hallux valgus deformity (HV) and pain are the most frequently encountered foot complaints for primary care physicians. In this study, the relation between erosion and hallux valgus angle (HVA) was investigated.
Methods: This study was performed on 46 feet of 23 person. The study population were diagnosed as having RA according to ARA criteria and have been followed in our outpatient clinics with RA. HVA of all patients were at least 15º. Each foot was evaluated. The range of motion of 1.MTP joint was measured. Foot radiograms were taken on AP while the foot was bearing full weight. Modified Larsen method was used to evaluate the severity of erosions.
Results: There was no correlation between HVA and erosion scores ($r=0.175$, $p>0.05$). HVA significantly corralated with 1.MTP extension and 1. MTP flexion respectively ($r=-0.505$, $p<0.05$; $r=-0.574$, $p<0.05$). Any significant relation between 1.MTP erosion and 1.MTP extension ($r= -0.193$ $p>0.05$), 1. MTP flexion ($r= -0.234$, $p>0.05$).
Conclusions: Although any relationship between HVA and erosion was not determined, HVA negative correlated with 1.MTP ROM in patients with rheumatoid arthritis.

PP164

RELATIONSHIP BETWEEN SEX HORMONES AND BONE MINERAL DENSITY IN WOMEN WITH ANKYLOSING SPONDYLITIS

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Objectives: A role for sex steroids in the pathogenesis of ankylosing spondylitis (AS) is suggested by the male predominance, the peak age of onset in young adults, the increased number of first manifestations and flares after pregnancy, and the fact that sex steroids may modulate immune functions. Bone loss as well as bone formation is a feature of progressive AS. Women with AS have reduced hip bone mineral density (BMD). The aim of this study is to asses BMD by dual energy x-ray absorptiometry (DEXA) in women with AS, and to determine any relationships with the sex hormones and bone mass.
Methods: Twenty-five patients, all female, aged 21 to 54 years and presenting with AS were studied. BMD was measured in the lumbar spine and the left proximal femur using dual energy x-ray absorptiometry. Plasma levels of follicle stimulating hormone, luteinizing hormone, total testosterone, dehydroepiandrosterone sulphate (DHEAS), estradiol (E2) and progesterone were measured.
Results: The mean age at study was 36.5±9.1 years old and the mean disease duration was 7,4±7 years. Significant osteopenia was found in 30% of patients when the femoral hip was examined and in 15% of patients when the lumbar region was examined. Plasma DHEAS levels were negatively correlated with BMD in the lumbar spine ($r=-0.48$, $p=0.051$) and femoral neck ($r=-0.52$, $p=0.03$). E2/DHEAS ratio was correlated with BMD in the lumbar spine ($r=0.54$, $p=0.03$) and was not correlated wit BMD in the femoral neck ($r= 0.49$, $p=0.52$).
Conclusions: The results of this study suggest that one of the factors responsible for the development of osteoporosis in cases with AS may be sex hormone dysfunction, which is claimed to have a role in the pathogenesis of the disease.

PP165

COEXISTANCE OF SEROPOSITIVE RHEUMATOID ARTHRITIS AND UNDIFFERANTIATED SPONDYLOARTHROPATHY

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Coexistence of rheumatoid arthritis and spondyloartropathies in rheumatic patients was reported rarely.Our case was a 50 years old female patient with seropositive rheumatoid arthritis and HLA B-27 negative undifferantiated spondyloartropathy concurrently.The case was suffered from symmetric peripheral arthritis and inflammatory heel pain.Complaints in her hands ,low back and knees began after an emotional trauma that she had two years ago.Her findings fulfilled the 1987 American rheumatism association criteria for rheumatoid arthritis.Ritchie articular index was 44.She had bilateral sacroileitis radiographically and focal activity at right inferior calcaneus scintigraphically with the absence of spondylitis. We accepted the patient as seropositive rheumatoid arthritis and undifferantiated spondyloartropathy.

PP166

RELATIONSHIP BETWEEN SERUM TNF-ALPHA LEVELS AND DISEASE ACTIVITY IN RHEUMATOID ARTHRITIS

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Objectives: To examine the relation between serum TNF-alpha and disease activity in Rheumatoid Arthritis(RA).
Methods: We studied 41 patients who fullfilled the American College of Rheumatology Criteria for RA and 25 age and sex matched healthy controls. Disease duration and medications being used, number of tender and swollen joints were recorded. DAS28 was used to define disease activity. TNF –alpha was measured by ELISA kit as pg/ml, CRP was measured by nephelometric method as mg/dl and sedimentation rate by Westergren method as mm/h. Analysis of data was performed using independent two samples t test and Pearson correlation analysis.
Results: Age and sex did not show differences between RA patients and controls. The mean disease duration was 9.70 + 9.08 years and the mean DAS28 was 5.45+ 1.24. TNF- alpha serum levels of RA patients were significantly high compared to control group (37.16+ 25.76 and 25.44 + 11.30 respectively) ($p= 0.014$). There was no correlation between TNF-alpha serum levels and disease duration, DAS28, ESR, CRP ($p>0.05$).
Conclusions: Even though TNF alpha levels were found to be significantly high in RA patients, we did not find any correlation between TNF-alpha serum levels and clinical and laboratory disease activity markers (DAS28, ESR, CRP) in RA. The lack of correlation between serum TNF- alpha levels and disease activity can be attributed to the clinical and histologic heterogenity of RA.

PP167

THE CLINICAL, PULMONARY FUNCTIONAL, AND LUNG HRCT EVALUATION OF LIFE-LONG NON-SMOKING AND RESPIRATORY ASYMPTOMATIC PATIENTS WITH RHEUMATOID ARTHRITIS AND ANKYLOSING SPONDYLITIS

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Objectives: The aims of this study were to evaluate the relationships between clinical, laboratory, HRCT and PFT findings in non-smoker,respiratory asymptomatic MTX-used RA patients, SSZ-used AS patients, and healthy controls.

Methods: Totally sixty persons selected from Ankara Training and Research Hospital, Department of Physical Medicine and Rehabilitation, Division of Rheumatology were included in this study. Routine clinical, laboratory and disability scales (HAQ, BASFI)were recorded. Pulmonary function tests were performed by using Sensor Medics Vmax29 system. A spiral CT (Hitachi Pronto) was used for lung imaging.

Results: Small airway involvement was common in all groups. Restrictive disorder was frequently seen in AS group ($p<0.05$). Fourteen patients (70%) with RA and 10 patients (50%) with AS had positive HRCT findings on radiological examination. ILD was the mostly seen HRCT findings in both RA (30%) and AS (40%) groups. The chest expansion limitation, the score of VAS for pain, and CRP levels were high in HRCT(+)patients with AS ($p<0.05$).

Conclusions: The future large, prospective, controlled studies are needed the importance of pulmonary rehabilitation in rheumatology practices.

PP168

A CASE WITH POLYARTERITIS NODOSA MIMICKING RHEUMATOID ARTHRITIS

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Arthralgia or arthritis is present in polyarteritis in as many as 50 percent of patients. An asymmetric, episodic, non-deforming polyarthritis involving the larger joints of the lower extremity may occur in 20 percent of cases and is common early in the course of the disease. Such symptoms may mimic those of rheumatoid arthritis, but as other manifestations appear, the polyarthritis usually subsides without residual joint damage.

A 64-year old male patient with a diagnosis of oligoarticular onset rheumatoid arthritis presented with fever, fatigue, pain, significant weight loss and cough in May, 2004 and was diagnosed as pneumonitis and treatment was begun in the department of internal medicine. During follow-up lower extremity pain and paresthesia progressed and bilateral drop-foot was observed with a 3-day interval. Pulse steroid therapy was initiated and he was hospitalized in the rehabilitation department.

Muscle weakness which was prominent in the lower extremity interfered with his ambulation. Achilles reflex was negative and hypoesthesia was present in both feet. There wasn't any sign of active arthritis. Erythrocyte sedimentation rate and CRP values were increased and RF was positive. He had leucocytosis and hypoalbuminemia. Anti HBs Ag was positive. Sensoriomotor polyneuropathy was found in the electrodiagnostic test. Sural nevre biopsy revealed vasculitis with fibrinoid necrosis. According to ACR criteria he was diagnosed as polyarteritis nodosa. Medical therapy was initiated and the patient was discharged after a rehabilitation program of 2 weeks with walker.

Polyarteritis nodosa may present in various ways. Initially it can mimic rheumatoid arthritis. Additional neurological findings may lead to a diagnosis of vasculitis. This case was presented to remind the physician of the PAN in differential diagnosis of oligoarthritis.

PP169

A CASE WITH UNDIFFERENTIATED SPONDYLOARTHRITIS AND FAMILIAL MEDITERRANEAN FEVER WHICH WAS DEVELOPED AFTER HENOCH-SCHONLEIN PURPURA

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Objectives: Although rare, overlap syndromes can be seen in rheumatic diseases. Our patient was a 23 year old man who was thought to have overlap syndrome. He was firstly diagnosed as Henoch-Schonlein purpura (HSP) due to skin rash on both medial malleols and intestinal angina and his treatment was began. He was admitted to our clinic for low back and bilateral gluteal pain (pain VAS= 80) high fever (subfebril) and persistent abdominal pain. He was diagnosed as Familial Mediterranean fever (FMF) according to FMF Tel-Hoshomer criteria and colchisin treatment was began. Severity of symptoms were reduced with colchisin therapy and sacroiliac computerised tomography showed grade 2 bilateral sacroiliitis. His low back pain was in inflammatory type and according to Mander Entesis Index, entesis sensitivity was found at 66 points. There wasn't any painful and inflammated joint except gluteal pain. He was diagnosed as SpA according to Europa Spondylarthropathy Study Group (ESSG) classification criteria. HLA B27 is commonly founded as negative with SpA in FMF. Our patient was HLA B27 negative. Ankylosing spondylitis, psoriatic arthritis, reactive arthritis and inflammatory bowel disease diagnosis were excluded and therapy for undifferentiated SpA was began. His gluteal and low back pain was reduced in a week with NSAID, exercise and physical therapy agents (pain VAS =10).

Conclusions: In previous studies patients with FMF in HSP, or seronegative SpA in FMF were reported but there wasn't any patient having these three diseases together.

PP170

EFFECT OF DISEASE ACTIVITY, FATIGUE, ENTHESITIS AND FUNCTIONAL STATE ON LIFE QUALITY FOR PATIENTS WITH ANKYLOSING SPONDYLITIS

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Objective: Investigating the effect of disease activity, fatigue, enthesitis and functional state on life quality for patients with ankylosing spondylitis.

Methods: Adults (>16 age) with Modified New York Criteria were randomly involved for study. Patients with malignancy, fibromyalgia and other systemic inflammatory rheumatic diseases were removed from cross-section study was planned and demographic, clinical, functional, radiographic and laboratory data of patients were evaluated.

Disease activity was evaluated with BASDAI. Mander Enthesis Index (MEI) was used for evaluation of enthesis involvement. MAF

was used to evaluate fatigue and BASFI used for functional evaluation, Short Form 36 (SF 36) scala was performed to evaluate the life quality of patients. Statistical analyses were made by Pearson and the last model of Multiple Lineer Regression analysis.

Results: 46 patients (37 male) were included in this study. The mean age of patients were 39,2 (SD=11,46). Physical function, in SF 36 subgroups, was the most significant corelation with MEI, physical role was the most significant corelation MEI, secondary significant corelation with CRP level. Pain was the most significant corelation with MEI, secondary gander and third MAF total value. In SF 36 subgroups the most significant corelation with general health was found between the total of BASDAI values and total of MEI values. We found significant corelation between vitality and the total of MEI values. Mental health and social function showed no significant corelation with other parameters. A significant corelation between emotional role and the total BASFI values with chest expansion.

Conclusion: Disease activity, fatigue, enthesitis, laboratory finding, functional and clinical state were effecting quality of life of patients with ankylosing spondylitis

PP171

CO-EXISTANCE OF ANKYLOSING SPONDYLITIS AND OSTEOMALACIA (CASE REPORT)

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Summary: Ankylosing Spondylitis(AS) is a chronic inflammatory disease related with HLAB27 which effects the sacroiliac joints and the vertebrae. The diagnostic criteria includes back pain that lasts for at least 3 months and doesn't decrease with rest, restrictrion of the lumbar vertebrae movement and decrease in chest expansion. Among the peripheral joints, the hip and the shoulder joints are the most commonly involved. Co-existance of AS and osteomalacia have been reported in the literature. A42-year-old male patient applied with pain in the shoulders, waist and hip. The ranges of movement of the waist and shoulder joint were restricted.Chest expansion was 1 cm, modified lomber schober was 3 cm, Ganslen and FABERE tests and HLAB27 were positive. Compression fractures were observed on bidirectional thorocolumbar X-ray. The laboratory findings were concordant with osteomalacia.0,5µg active vitamin D and 500mg calcium treatment were started.

PP172

SEVERE ANKYLOSING SPONDYLITIS WITH SPONDYLODISCITIS MIMICKING TUBERCULOUS AND TREATMENT WITH ETANERCEPT: A CASE REPORT

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Objectives: Ancylosyng spondylitis(AS),the prototype of the spondiloarthritides,the most frequent inflammatory spinal disease in adults,usualy starts in the sacroiliac joints. There is a typical pattern of joint involvement in cases of AS ,but presantation of discitis is rare.

Methods: We present a case of 26-year male with one year history of unresolved severe back pain. The patient had been treated under the diagnosis of tuberculous spondylodiscitis for three months. In first examination, marked limited range of motion and pain was observed in all spinal segments. The patient couldn't stand or walk due to disabling back pain that localized L3-L4 spinal segment. Bilateral sacroileitis were found on pelvic X-ray graphies. Contrast enhanced magnetic resonanace imaging(MRI) showed that L3-L4 spondylodiscitis and dejeneratif changes on most of thoracolumbar facet joints. On labaratuary tests acute phase reactants were extremely high and HLA–B 27 was negative. On PPD test 14 mm enduration was observed.The patient was diagnosed AS and were given daily doses of indomethazin 150 mg, sulfasalazin 3000 mg. But we didn't observed any healing and the pain as well as functional impairment became worst within 6 weeks. So open biopsy were planned to exclude of tuberculous discitis because of resistance to therapy and possible coincidance.The biopsy findings did not correlated with tuberculous discitis.The patient were given 50 mg etanercept at the beginning and then 25 mg twice a week subcutoneusly.In addition isoniazid adminstreted to avoid reactivation of tuberculous.

Results: After 12 dose therapy and 6 weeks later, sedimentation rate and CRP levels were decreased significantly .The pain decreased markedly and the patient could stand without help and walked using two cane.

Conclusions: The patient with AS with spondylodiscitis mimicking tuberculous which is refracter to conservative medical therapy was treated by etanercept satisfactory. Anti TNF alpha blockers should be considered on the treatment of refracter AS

PP173

SERVICAL SPINAL CORD INJURY AS A COMPLICATION OF ANKYLOSING SPONDYLITIS: (A CASE REPORT)

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Objectives: Fracture of the servical spine is not a rare complication in patients with Ankylosing Spondylitis (AS). We report a case of servical spinal cord injured (SCI) patient with AS due to minor trauma.

Methods: A 51 year-old Turkish male had a history of AS for 15 years. After he had a convulsion, magnetic resonance imaging of the brain was taken under general anaesthesia. When the patient woke-up, SCI was detected due to C7 vertebral fracture. C7 corpectomie and fussion operation was done by neurosurgeon.

Results: Physical examination was as follows; The American Spinal Cord Injury Association (ASIA) impairment scale C, Motor level C6, Sensory level C6.

Conclusions: Patients with AS seem to run a high risc of traumatic SCI even with a minor trauma. This tendency is related to ossification of spinal ligaments and osteopenic changes in spinal vertebrae. Education about this risk should be given to patients, family and the medical staff.

PP174

THE RELATION BETWEEN SERUM HYALURONIC ACID LEVEL AND CLINICAL AND FUNCTIONAL VARIABLES IN ANKYLOSING SPONDYLITIS

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Objectives: Background: The relation between disease activity and serum hyaluronic acid (HA) level was mentioned in previous studies. Objective: To assess the relation between serum HA levels and clinical and functional variables in ankylosing spondylitis (AS).
Methods: Patients with AS according to Modified New York criteria and controls among healthy people were recruited randomly. Pain during rest and movement (VAS), morning stiffness, disease duration, metrological measurements, BASDAI, BASFI, Multidimentional Assessment of Fatigue Scale (MAF), SF-36. Serum HA level (ng/mL) assessed by ELISA method. $p < 0.05$ was accepted as significant.
Results: 30 AS patients (23 male) and 14 healty controls (8 female) were recruited randomly. Mean age of patients and controls were 38.3 (SD: 10.85) and 46 (SD: 7.37) respectively. There was not significant difference between ages of groups (similarity). HA levels were 40.41 (SD: 34.77) ng/mL in AS and 24.77 (SD:22.41) ng/mL in controls. There was a significant corelation between HA concentration with distance of hand-floor (p: 0.014) and distance of jaw-sternum (p: 0.016), CRP (p: 0.027), serum albumin (p: 0.010), C3 (p: 0.013) and IgA (p: 0.045). There was not a significant correlation between HA and VAS, morning stiffness, BASDAI, BASFI, MAF, MEI, SF-36. Although the mean HA level in AS is 63 % more than in controls, the correlation (student t) between two groups was not statistically significant ($p>0.05$).
Conclusions: Although serum HA level has statistically significant relation with some clinical variables such as CRP, serum albumin and IgA, it has not significant relation with disease activity (BASDAI) and functional variables. Serum HA level may increase in AS but it won't be an indicator to assess disease activity according to our results.

PP175

A SAPHO SYNDROME WITH PALMOPLANTAR PUSTULOSIS

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Objectives: SAPHO syndrome is a sero-negative oligoarthritis charecterized by synovitis, acne, pustulosis, hyperosteosis and osteitis (osteomyelitis). Especially dermal involment might cause to be overlooked. In this study, a SAPHO case with disseminated palmoplantar pustulosis is presented .
Methods: A 38- year old female patient, who has pustular lesions in her hands and feets after physical trauma, however she had not any complaint. Anterior chest pain and swelling of right sternoclavicular joint fallowed the dermal lesions getting more severe day by day. For last 3 months she has been suffering from stiffness lasting 2 hours and low back pain in the morning. In physical exemination, there were disseminated pustular lesions on the soles and palms. There was no lesions other regions such as scalp and other skin areas. There were swelling and much tenderness on the right sternoclavicular joint. As for left sternoclavicular joint, there was tenderness while pressing, but no swelling. Backward flexion of spine was limited and painful, and sacroiliac tests were positive on the right side. Schober test was measured as 3 cm, and thoracal expantion was 5 cm. Sedimantation was 53 mm/hour, CRP was 65.8mg/dl and RF was negative. On the right sacroiliac graphy, there was sclerosis on the right iliac bone. On the lombosacral graphy, there was syndesmophitisis on the lomber vertebrae. On the sternoclavicular graphies, there were erosion and cortical irregularitis on both sternoclavicular joints. On the whole body Tc99m- MDP bone sintigraphy, accumulation consistant with arthritis on both sternoclavicular joints and right sacroiliac joint was determined. The case was evaluated as SAPHO syndrome with palmoplantar pustulosis, and treatment with sulfasalazine 1000 mg two times per day and Indomethacine 25 mg three times per day was applied.
Results: Althought SAPHO syndrome is increasingly common in our country, the cases with palmoplantar pustulosis are scarcely seen, and it is important because of its possibility to be confused with psoriatic arthritis. Since it is a rare variant of SAPHO syndrome, this case is thought to be worth of presentation.
Conclusions:

PP176

DIETARY MILK INTAKE AND DAILY ACTIVITIES IN PRIMARY SCHOOL CHILDREN

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Objective: Our aim was to investigate the relations between daily milk and milk product intake, and sportive activities of primary school children with anthropometric measurements together with the postural problems in primary school children.
Materials and Methods: A total of 1358 children from two primary schools (classes 4-8) were included in the study. One of these schools was a private school from a high socioeconomic part; the other one was a state school from a low socioeconomic part of Istanbul. After an interview, including questions about the demographics, daily habits, psychological status, and posture, inspection and detailed musculoskeletal examination were done.
Results: The mean age of the children was 12.18±1.47 years. 55.2% were males. 13.9% of children did not consume milk regularly. 46.1%drink one glass daily. Milk product consumption was insufficient in 15% and sufficient in 85%. Girls consume significantly less amount of milk then boys ($p<0.001$). Milk product consumption was similar in both boys and girls. In those with normal consumption of milk, the ratio of finding lower BMI (underweight) was less, however, they have a higher ratio of higher BMI (overweight or obese) ($p<0.001$).
90% of the children perform regular sports activities. 71.7% prefer one type of sports activity, and the rest do more than one type of sports. The most common sports activities were basketball, football, volleyball and swimming for primary school children.
Conclusions: Having a greater focusing on milk consumption in children, especially in girls will probably maintain a better peak bone mass and bone quality in later life. We also have to encourage the children for participation to sports activities. National programs should be instituted for reaching these goals.

PP177

OSTEOGENESIS IMPERFECTA TYPE I: A CASE PRESENTED WITH HAND DEFORMITIES

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In a 51 year-old woman the diagnosis of osteogenesis imperfecta type I was suspected with a history of fractures and dislocations after minor trauma in childhood, intensive blue sclera, short stature and hearing loss.
She was referred to our clinic with hand deformities and knee pain and stiffness. Patient had difficulty in walking and gave history of immobilization for 6 months because of knee pain.
She had Z deformity of the first phalanges, reducible swan-neck deformity of 3rd finger of left and 2nd finger of right hand, flexion contracture of proximal interphalengeal joint of the 5th finger of

left hand and syndactly of 3rd and 4th fingers of the right hand. She had bilateral flexion contracture of elbows and the right knee. Pes planus and short toes were the deformities of the feet. Acute phase reactants of the patient were normal. She had no history of arthritis and morning stiffness. Bone mineral density evaluated by DEXA showed severe osteoporosis of femur and lumbar vertebrae. She had radiographic evidence of healed fractures of left fibula , the 3rd metacarpal of the right hand, and 4th and 5th right middle phalanges, decrease in osseous density and bowing of long bones.
Conclusion: Osteogenesis imperfecta, affecting the collagen type I of the sclera, skin, ligaments and skeleton was presented with subluxations and ligamentous laxity resulting in hand deformities which may be misdiagnosed as hand deformities of rheumatoid arthritis.

PP178

RELATIONSHIP BETWEEN THE SEVERITY OF ENTHESOPATHY AND CLINICAL/LABORATORY PARAMETERS IN CASES OF ANKYLOSING SPONDYLITIS

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Objectives: To investigate the relation between clinical and laboratory parameters used to evaluate and follow up the disease activity with the severity of enthesopathy in cases of ankylosing spondylitis (AS)patients.
Methods: Twenty-three patients with definite ankylosing spondylitis(modified New York criteria) were included in this study. Patients were asked to record the severity of current pain, night pain and morning stiffness on a 100 mm. visual analogue scale(VAS). Stoke Enthesitis Index was used to measure the severity of enthesitis. Spinal measurements were performed. Bath Ankylosing Spondylitis Disease Activity Index(BASDAI), Bath Ankylosing Spondylitis Functional Index(BASFI), Bath Ankylosing Spondylitis Metrology Index(BASMI) were calculated.
Results: The mean age of the patient group was 34.56±8.98 years. The average disease duration was 93.13±63.59 months. The average values of current pain and night pain on a 100 mm. visual analogue scale were 5.43±3.50mm. and 6.44±3.40 mm. respectively. The mean severity value of morning stiffness was calculated as 6.62±3.56 mm. The average value of enthesitis index was 8.91±8.97. Enthesitis index (EI) was correlated positively with BASDAI(r= 0.581, p= 0.004) and negatively with lateral spine flexibility that was measured according to Calin's method(r= -0.479, p= 0.021).
Conclusions: Enthesitis index may be used for assessing the disease activity as it correlates with BASDAI. However, both EI and BASDAI are subjective measures. Therefore, it is necessary to combine EI with spinal measurements, such as lateral spinal flexibility for evaluating the patients with AS.

PP179

IS ANDROGEN LEVEL ASSOCIATED WITH SACROILIITIS IN ANKYLOSING SPONDYLITIS?

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Objectives: It is reported that sex steroids may play an important role in the pathophysiology of ankylosing spondylitis (AS). The aim of this study was to determine any relationship between the sex hormones and sacroiliac involvement in patients with AS.
Methods: Sixty five cases (44 males and 21 females) fulfilling the modified New York criteria for AS were included in the study. Sacroiliac grade was determined by anteroposterior radiographs of pelvis. Plasma total testosterone (T) and dehydroepiandrosterone sulphate (DHEAS) levels were measured.
Results: The mean age at study was 37.2 ± 9.3 years old and the mean disease duration was 8.6 ± 6.0 years. T level was low in 26.1 % and DHEAS level was low in 15.4 % of patients. Plasma T level was low in 50 % of patients with grade 2 sacroiliitis, 25 % with grade 3 sacroiliitis and 7.4 % with grade 4 sacroiliitis at the right side (R= 0.404, p= 0.001); and it was low in 60 % of patients with grade 2 sacroiliitis, 22.2 % with grade 3 sacroiliitis and 3.7 % with grade 4 sacroiliitis at the left side (R= 0.508, p= 0.0001). Plasma DHEAS level was low in 4.7 % of patients with grade 2 sacroiliitis, 6.7 % with grade 3 sacroiliitis and 27.5 % with grade 4 sacroiliitis at the right side (R= -0.300, p= 0.019); and it was low in 5.2 % of patients with grade 2 sacroiliitis, 5.5 % with grade 3 sacroiliitis and 28.5 % with grade 4 sacroiliitis at the left side (R= -0.308, p= 0.016).
Conclusions: According to the results of this study, low T levels were more frequently observed in patients with early stage of AS and low DHEAS levels were more frequently observed with late stage of AS.

PP180

IMPLICATIONS OF THE TREATMENT WITH INFLIXIMAB IN THE COMPLEX REHABILITATION OF PATIENTS WITH RHEUMATOID ARTHRITIS

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Objectives: We intended to estimate if the treatment with Infliximab(Remicade®) improves the rehabilitation results for the patients with rheumatoid arthritis (RA).
Methods: We studied 30 female patients with RA, joining the admission criteria for treatment with Infliximab, associated with Methotrexat 10-15 mg/day/week. The patients benefited by an unitary rehabilitation programme for 12-15 days, in the period of Infliximab administrations. We followed biological and functional parameters, expressed in the ADL and independence score. We compared the patients with themselves, in the periods with and without Infliximab.
Results: We obtained better results in the periods of rehabilitation associated with Infliximab : - the articular pain and swelling decrease over 75%, the active and pasive mobility increase between 50-80% by comparison with the period without Infliximab; - the control and co-ordination, and the muscular strength increase over 30%, specially at the proximal level of the limb; - the dynamic stability of the carrying joins increases even with inferior results at the distal level (below 30%), but the quality of gait increases over 45% (speed, distance, support, conditions); - the complex function of hand increases over 50%, specially for skill; - finaly, the ADL and independence score increase over 45% because of this association.
Conclusions: For these reasons, we believe in the long term therapy with Infliximab, an important support for the rehabilitation to improve the quality of live in RA.

PP181

LONG TERM EFFICACY OF INFLIXIMAB IN PATIENTS WITH ANKYLOSING SPONDILITIS

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Objectives: To evaluate the clinical and functional efficacy of long term infliximab therapy in patients with severe refractory ankylosing spondylitis (AS).

Methods: Four patients with AS, fulfilling the modified New York criteria for AS were included in the study. Patients received intravenous infusions of infliximab doses of 3 mg/kg at the beginning of the study and at the 2nd and 6th weeks of the follow up period. Treatment intervals of eight weeks have been used. The Bath AS Disease Activity Index (BASDAI), the Bath AS Functional Index (BASFI), Dougados functional index (DFI), pain on a visual analog scale (VAS), the Bath AS Metrology Index (BASMI), and quality of life short form (SF-36) index were assessed before, during, and after therapy. Laboratory markers of disease activity, including erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) levels, were determined.

Results: BASFI of the patients were 7.9, 3.8, 6.5, 7.63 at the beginning of the study and finally they were found as 3.26, 2.12, 5.95, 2.79 respectively. Clinical and functional improvement was also demonstrated with the above mentioned outcome scores of the activity indexes. BASDAI scores were as 6.4, 6.4, 8, 10 before the first infusion session and the remarkable decreases were found (1.22, 1.13, 3.54, 3.44 respectively). Similar changes of the remaining scores such as DFI, BASMI, VAS, SF-36 indexes, CRP and ESR also demonstrated that infliximab was a usefull agent in the treatment of refractory AS.

Conclusions: Serious side effects were not determined in these four patients and this study shows that TNF-α agents significantly reduces activity of disease and improves functions and quality of life in patients with severe AS.

PP182

AN UNUSUAL ASSOCIATION: TOXOPLASMOSIS, ERYTHEMA NODOSUM AND ARTHRITIS

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Objectives: We describe here a patient presented with erythema nodosum (EN) , polyarthralgia, who subsequently had monoarthritis and was found to have toxoplasmosis.

Methods: A 40 year old female patient presented with malaise of one month duration, diffuse arthralgia and a tender, 2x2 centimeter red nodule on left pretibial area. The patient was assessed by Dermatology department and received the diagnosis of EN clinically. As she had a history of oral aphteous lesions, patergy test was done three times with negative results. On follow up the patient had swelling and aggravated pain on the left knee. There was no history of an infection or any drug use during last months. ESR was 74 mm/hour, Hb was 11.7 g/dl, leucocyte count was normal. RF, CRP, Brucella agglutination, cultures, fecal examination for amoebia and giardia were all negative. Viral markers were negative but toxoplasma IgM and IgG antibodies were positive. The result of toxoplasma avidity test was 26 % indicating transition from acute to chronic phase. Thorax CT was normal. Symptoms improved in 4-6 weeks with NSAID's and physical therapy. At next visit about 6 months later the toxoplasma IgG level was elevated with % 100 avidity indicating chronic stage.

Conclusions: EN is considered to be a hypersensitivity response to various stimuli including many infections and drugs. It is also common in the course of systemic diseases like Sarcoidosis and Behçet's disease. In about 70% of the cases arthritis of the lower extremity joints accompanies. Literature about the association of EN with toxoplasmosis is scarce but the possibility must be kept in mind if no other known cause of EN is found.

PP183

SEVERITY OF PAIN AND RELATIONSHIP WITH PSYCHIATRIC SYMPTOMS, ALEXITYMIA, DEPRESSION AND ANXIETY IN TURKISH FEMALE OUTPATIENTS WITH FIBROMYALGIA.

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Objective: Aim of this study was to evaluate the severity of pain and relationship with psychiatric symptoms, alexitymia, depression and anxiety both self rated and clinician determined in Turkish female outpatients with fibromyalgia.

Method: The study was conducted between October 2003 and March 2004 in Baltalimani Bone Diseases Education and Research Hospital in Istanbul. Forty-three patients with fibromyalgia according to the operational criteria proposed by the American College of Rheumatology were included in the study. Other than sociodemographic form, we used Toronto Alexitymia Scale 20 (TAS-20) and for psychiatric symptoms we used SCL-90. Pain was measured by Visual Analog Scale (VAS) and Verbal Rating Scale (VRS) and the anxiety and depression levels were measured by self-rating scales the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI), and clinician rating scales the Hamilton Anxiety Rating Scale (HARS) and the Hamilton Depression Rating Scale (Ham-D).

Results: VAS only showed positive correlation with somatic symptoms of SCL-90, while VRS did not show any correlation. Both VAS and VRS showed positive correlations with BAI and HARS. VAS showed positive correlation with somatic subscale of HARS and VRS showed positive correlation with psychic subscale of HARS. Determinants were somatic and paranoid symptoms when taking VAS score as a dependent variable in linear regression. VRS score was taken as a dependent variable in other linear regression and determinant was score of psychic subscale of HARS.

Conclusion: VAS was associated with somatic symptoms and somatic anxiety, while VRS was associated with psychic anxiety. Also results of this study suggests that whatever the causal relationship is anxiety severity is related with severity of pain in patients with fibromyalgia.

PP184

THE EFFICACY OF LOCAL ANESTHETIC INJECTON AND DRY NEEDLING IN MYOFASCIAL PAIN SYNDROME

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Objectives: The assessment of efficacy of injection therapy with local anesthetic and dry needling of myofascial trigger points in the treatment of myofascial pain syndrome.
Methods: The study population consisted of 89 patients who had active myofascial trigger points in one side of the upper trapezius. The patients were randomly assigned to 2 % lidocaine injection (LA) and dry needling (DN) groups. Pressure pain threshold values (pressure value as mm/Hg at which the patient feels the pressure with algometer) and subjective pain intensity values (Visual Analog Scale, Likert pain score) have been recorded at three week and three month visits for the follow-up of therapy. Depression and anxiety were assessed using the Beck Depression Inventory (BDI) and the Stait Trait Anxiety Inventory I and II (STAI).
Results: Post treatment evaluations demonstrated a significant increase in pressure pain threshold values (p=0,001), and significant decrease in the VAS (p=0,001) and Likert scores (p=0,001) in both groups, the groups were similar in these responses. After three weeks of treatment compared with DN, the decrease in trigger points was more evident in the LA group (p=0,002). At three months decrements in BDI and STAI-II scores were significant in the LA group (p=0,003; p=0,036) respectively.
Conclusions: Trigger point injection with LA or DN were both found to be effective but the clinical response started earlier and improvements regarding the psychological profile were obtained only in LA group.

PP185

DEMOGRAPHIC CHARACTERISTICS OF DISABLED PERSONS IN ISTANBUL

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Objective: It was aimed by this survey to get the prevalence and demographic characteristics of the disabled persons in Istanbul. The preliminary findings will be used to implement the projects for rehabilitation and adaptation of the disabled.
Method: The survey was conducted by the Health Directorate of Istanbul Municipality in 2002 for finding the demographic characteristics of disabled persons in Istanbul. 362.292 persons determined by randomized sampling were evaluated in their living conditions by means of a questionnaire.
Findings: 13 423 persons were found to be blind, deaf, speech-disordered, physically or mentally handicapped. The ratio of all disabled persons in the sample is 3.7%, and 45.7% of these are women. In all groups of disability, men are slightly more than women. 66.8% the disabled are below 40 and 36.2% are married. Only 10.5% of the mental handicapped are married, which is the least ratio. 24% of the disabled persons have at least one child. Though 83.7% are above 10 years old, 45.6% of the population is not literate. Nearly one third of the speech-defected persons and one fifth of the mental handicapped are below 10, but the ratios of non-literate are 69.2% and 74% respectively. 65.3% of the disabled are not employed and only 15.7% of the mental handicapped have a work. Students and retired reach to one fifth of the disabled population. 60.9% don't have any health insurance. The others are mostly insured by the Social Insurance Organization (SSK). More than half of the disabled persons' income is below the legal minimum monthly pay which is 300 million Turkish liras and the income does not seem to vary according to the kind of disability.
Conclusions: We found a 3.7% ratio of disability in our sample, in Istanbul. This city takes a great immigration from all of the country, so this figure might represent the situation in Turkey to a great extent.

PP186

CO-EXISTING EXTRASKELETAL DISEASES AND CLINICAL SIGNS IN FIBROMYALGIA:

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Objective: Fibromyalgia Syndrome (FS), is a chronic musculoskeletal syndrome characterized by diffuse pain. Associated symptoms include, fatigue, sleep disturbances, headaches, irritable bowel syndrome, parestesias, cognitive disturbances, depression and anxiety. The aim of this study was to evaluate the frequency of common co-existing syndromes linked with gastrointestinal, dermatologic, respiratory, genitourinary and other systems in patients with FS.
Materials-Methods: Ninety-four women having diagnosis of FS according to 1990 American College of Rheumatology criteria were included in this study. Patients were questioned for the co-existing extraskeletal symptoms.Visual Analog Scale (VAS) was used to evaluate musculoskeletal pain.
Results: Mean age of the patients was 43.5±9.9 years. Seventy-three percent of them were married, 57.4% were housewife. Mean VAS score was 7.3±1.9 cm. Ninetyseven percent of patients suffered fom fatigue, 75.3% from sleep disorder and 78.5% from morning stiffness. Sixtyfive complained of cold extremities, 46.3% of eccessive sweating, 77.4% parestesias, and 50.5% tremor in the hands. Some revealed additional diseases with 10.6% of patients having history of asthma, 46.8% gastritis, 27.5% migraine, 22.3% globus histericus, and 47.3% dermographism. Sixty-seven percent of patients suffered from functional respiratory complain, and 76.6% from palpitation without any determined etiology. Thirty seven percent of patients complained from disuria, and 29% from dismenorhea frequently, and without any organic reason.
Conclusion: Extra-skeletal signs and symptoms; especially linked with dermatologic, gastrointestinal, respiratuary, and genitourinary systems are commonly seen in FS patients, and agravating the present disability caused by FS itself. These group of diseases can be linked with psychogenic factors which might need special attention in the planning of treatment.

PP187

ANTIDEPRESSANT THERAPY IN FIBROMYALGIA SYNDROME:

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Objective: Antidepressants are commonly used in the treatment of fibromyalgia syndrome(FS). The aim of this study is to evaluate the effectiveness of three different antidepressant drugs; citalopram, venlafaxin and amitriptyline in the treatment of FS.
Materials and Methods: Fifthy-five patients with diagnosis of FS were taken into the study, and randomized into three groups. First group received a selective serotonin reuptake inhibitor citalopram (20 mg/day); the second group a tricyclic antidepresant amitriptyline (25 mg/day); and the third group a serotonergic noradrenergic receptor inhibitor Venlafaxin (75 mg/day) for 12 weeks. Visual Analog Scale (VAS) was used for the measurement of

musculoskeletal pain, Fibromyalgia Impact Questionaire (FIQ) and Health Assesment Questionaire (HAQ) for functional impairment, and Beck Depression Scale (BDS) for depression. The number of trigger points and patient satisfaction were evaluated as well.

Results: Mean age of the patients were 42.5±9.4 (21-59)years, and duration of musculoskeletal pain was 5.5±5.3 (1-25)years. The number of trigger points decreased with time in all the three groups($p<0.01$). There was a significant decrease in VAS scores in all the groups ($p<0.001$). According to the FIQ scores; amitriptyline group showed an initiation of improvement from the 4^{th} week and continuing at the 12^{th} week($p<0.01$), citalopram group at the 8^{th} week and continuing at the 12^{th} week($p<0.01$), while venlafaxin group starting later, at the 12^{th} week($p<0.05$). According to HAQ scores, only venlafaxin group showed improvement at the 12^{th} week($p<0.05$) without any marked difference in two other groups. Improvement in BDS began in the 4^{th} week, and continued in the 8^{th} and 12^{th} weeks in citalopram group($p<0.001$); in the 8^{th} week in the amitriptilin group continuing in the 12^{th} week ($p<0.05$). The BDS changes in Venlafaxin group were only pronounced in the 12^{th} week ($p<0.01$). At the end of 12^{th} week, in all evaluated parameters, no statistically differences were found among the three groups ($p>0.05$).

Conclusion: Three different types of antidepressants investigated in this study were found to be effective in the treatment of FS at the 12^{th} week. However, the initiation time of beneficial effects were different in all antidepressants. As a result, symptoms of FS patients can be reduced with the use of antidepressants, but long term follow-up is needed.

PP188

WHICH IMPROVES BETTER: FLUOXETINE OR FLUOXETINE COMBINED WITH EXERCISE?

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Objectives: To evaluate the efficacy of fluoxetine alone and combination with stretching and aerobic exercises in the treatment of fibromyalgia syndrome.

Methods: In this prospective, randomized, single blind clinical study, 40 patients diagnosed as fibromyalgia syndrome according to American College of Rheumatology 1990 criterion were evaluated. Patients were randomized into two treatment groups. While both groups received Fluoksetin 20mg/day, stretching and aerobic exercises 1 day per week administered by physical therapist were added to the second group. The exercise program was asked to be continued at home on the other days of the week. Duration of treatment was 8 weeks. Patients were evaluated at the inclusion time and subsequently afterwards in 4. and 8.th weeks. Evaluated variables were pain, sensitivity of tender points (measured by algometer), the results of the Fibromyalgia Impact Questionnaire (FIQ), Health Assesment Questionnaire (HAQ) and Beck Depression Inventory.

Results: Demografic variables were not different between the two treatment groups ($p>0.05$). Mean age was 41,8 years. Duration of symptoms was 4,6 and 3,8 years respectively. All patients were women. 8 patients left the study within the first 15 days due to adverse effects. The improvement in sensitivity of tender points, Beck Depression Invantery and fatigue and anxiety parameters of FIQ was statistically significant in the first group ($p<0.05$) and more significant in the second group ($p<0.01$). Morning stiffness, well feeling days, morning tiredness parameters of FIQ were significantly improved in both groups ($p<0.05$). The improvement in pain and depression was significant in the second group ($p<0.05$) and more significant in the first group ($p<0.01$). In evaluation of HAQ scale, only second group had significant improvement ($p<0.05$). The rate of benefit in all variables was not significantly different between the groups.

Conclusions: At the end of our 8 weeks treatment period, it is concluded that fluoxetin is effective in the treatment of fibromyalgia syndrome. When combined with exercise treatment, fatigue, anxiety, depression and general health improves better than fluoksetin alone

PP189

THE RELATIONSHIP BETWEEN TEMPOROMANDIBULAR DISORDERS, OROFACIAL PAIN AND FIBROMYALGIA

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Objectives: Fibromyalgia (FM) is a pain syndrome with unknown etiology, characterized by widespread pain, multiple tender points, fatigue, poor sleep quality, paresthesia and psychological problems. The temporomandibular disorders (TMDs) are a complex heterogeneous group of conditions involving masticator muscles and/or temporomandibular joints and characterized by chronic facial pain. The purpose of this study was to determine the coexistence of FM syndrome and temporomandibular disorders.

Methods: Sixteen women diagnosed as FM according to ACR criteria and 17 women diagnosed as TMD; a total of 33 subjects (mean age: 33,03±10,63 years) were included in the study. All patients were examined by a dentist and by a physiatrist in order to determine the coexistence of two conditions.

Results: In TMD group coexisting problems were: localized facial pain in 9 patients (52%), myofacial pain syndrome in 4 patients (23%), and FM in nine patients (52%). In FM group coexisting problems were; TMD in 3 patients (18%), and localized facial pain in 16 (100%) patients. We could not find any significant effect of coexistence of TMD in FM patients with respect to headache; sleep quality, number of tender points, and visual analog scale scores.

Conclusions: Our results show the high incidence of coexistence of fibromyalgia, orofacial pain and temporomandibular disorders. These disorders should be managed in a multidisciplinary order to find out coexisting clinical problems.

PP190

THE EFFECTIVENESS OF MAGNESIUM SUPPLEMENTATION IN FIBROMYALGIC PATIENTS

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Objectives: The management of fibromyalgia is controversial and definitive therapy has not been found yet. Recently usefulness of magnesium supplementation for fibromyalgia has been suggested by limited number of reports. In this study we investigated the effectiveness of the magnesium therapy on primary fibromyalgic patients.

Methods: 60 premenopausal women who diagnosed primary fibromyalgia according to ACR criteria and aged and weight matched 20 healthy volunteer women were evaluated. The patients with thyroid function disorders, hypertension, diabetes mellitus, liver and renal dysfunction, anemia, osteoporosis and inflammatory arthritis were excluded. The patients were randomized to receive magnesium (magnesium diasporal granule, 1830 mg/day) (Group I, N=20), amitryptilin (Laroxyl tablet, 10mg/day), (Group II, N=20) or magnesium plus amitryptilin (Group III, N=20) for 8 weeks. 20 healthy women was accepted as control group (Group IV). All subject's pain, fatique, headache, sleep disturbances, irritability and parasthesia were evaluated before and after the treatment. Pain was

assessed by visual analog scale (VAS), short Mc Gill Pain Questionaire and dolorimetric measurement. The number of the tender point was recorded and tender point index was calculated. Fibromyalgia Impact Questionnaire (FIQ), Beck Depression and Beck Anxiety Questionaire were also evaluated.

Results: There were no differences between the 4 groups for characteristic parameters. After the treatment period there was no found significant difference between the magnesium group and control group according to pain, clinical findings (except fatigue), FIQ, Back Depression scale and Back Anxiety scale. Amytriptylin was found effective on VAS score, Mc Gill questionnaire score, the number of the tender point and tender point index, clinical parameters, and Back anxiety score. There were no significant differences between the amytriptylin and magnesium+amytriptylin groups except dolorimetric measurement.

Conclusions: Magnesium supplementation therapy is not effective for pain, clinical semptoms, FIQ, Back depression and Beck Anxiety scale in fibromyalgia. It was found effective only the number of the tender point, tender point index and fatigue.

PP191

THE RESPIRATION FUNCTION TESTS OF THE PATIENTS WITH PRIMARY FIBROMYALGIA SYNDROME

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Objectives: To measure the respiratory function tests of the patients with primary fibromyalgia syndrome (FMS) and compare them with the healthy control group and to define the respiratory problems of these patients.

Methods: 24 female patients who were diagnosed with FMS according to the criteria of the 1990 American Rheumatology Association and a group of 15 sedentary healthy control group with similar demographic characteristics were included in the study. The measurements of pulmonary function tests (PFT) were done for the patient and the control group. The test which is appropriate to the "acceptibility" and "reproducibility" criteria according to the standardisation guidelines of the spirometre was accepted by repeating these measurements three times. Forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1), FEV1/FVC, forced expiratory flow rate 25-75% (FEF 25-75%), peak expiratory flow (PEF), vital capacity (VC) and maximum voluntary ventilation (MVV) parameters were measured. Student test was used while comparing the patient and control groups. Statistical analysis was done by using the SPSS 10.0 program.

Results: A significant difference in terms of all observed respiratory function test parameters was not found between the patient and control groups. While a spirometric restrictive ventilatory defect was not found in the patient and control group individuals, in one patient (4.16%) generalized airway obtruction was found.

Conclusions: There is no difference in the respiratory capacity of the patients with FMS, who are at the same age and sex. MVV value giving information about the whole mechanics of the lung (complience and resistance) and the respiratory muscles was not different between the groups. There was not a significant spirometric restrictive or obstructive typed ventilatory deficiency in the patients.

PP192

THE EFFECTS OF THE AEROBIC EXERCISE PROGRAM ON THE CARDIOPULMONER CAPACITY AND DISEASE SYMPTOMS OF THE PATIENTS WITH PRIMARY FIBROMYALGIA SYNDROME

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Objectives: To observe the effects of aerobic exercise program on the illness symptoms and cardiopulmonary capacity of the patients with primary Fibromyalgia Syndrome (FMS) and to find out whether there is a difference or not in terms of cardiovascular capacity among the patients with primary FMS and sedentary healthy people.

Methods: The study has been done on 20 female patients with primary FMS. Before the study and after a 6-week controlled aerobic exercise program, a cardiopulmonary exercise test has been applied on all cases. The symptoms, psychological state and life quality of the cases have been evaluated before and after the exercise program. Pain level, fatigue, sleep quality, a global self-evaluation of the patient and the global evaluation of the doctor has been measured by VAS. The number of sensitive points and the duration of morning stiffness have been recorded. Beck Depression Index and SF-36 have been applied. The first cardiopulmonary results of the cases with FMS have been compared with a control group of 15 sedentary healthy people who were similar in terms of age, sex and BMI. Statistically analysis was done by using the SPSS 10.0 program.

Results: When the patient and control groups are compared, although VO2 max was lower in the patient group, this was not a significant difference. VO2 max showing the aerobic condition after the exercise increased significantly in the patients. Ache, number of sensitive points, morning stiffness duration, fatigue, sleep and depression a significant recovery has been discovered. Ache, physical role, social function and emotional sub-measures in the SF-36 life quality scale have demostrated a considerable improvement.

Conclusions: Aerobic exercise programs lasting six to eight weeks are quite effective for the patients with FMS. There is not any limitation in the increase of the cardiopulmonary capacity of the patients after the exercise program.

PP193

CO-EXISTENCE OF CHRONIC FATIGUE SYNDROME WITH FIBROMYALGIA

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Objectives: To determine the proportion of chronic fatigue syndrome in patients with the diagnosis of fibromyalgia syndrome

Methods: Fibromyalgia patients were evaluated according to 1988 centre for disease control criteria for chronic fatigue syndrome.The patients fullfilled the CFS criteria were compared with pure fibromyalgia according to fibromyalgia tender points, fatigue percentage in last 6 months and fatigue severity scale and Beck depression scale. .Mann Whitney U test was used in statistical analysis

Results: 9 of 27 fibromyalgic patients met the CFS criteria .Mean of fibromyalgia tender points was 15±2.1, fatigue percentage was70.9±14, fatigue severity scale was 4.23±1.06and Beck scale was24,3 ±8.5 in fibromyalgic patients, the results for the CFS were 14.56±1.6; 75.55±13.3 ; 5.02±1.12 and 30,75±5,5 respectively. We only find statistical significance difference in Beck scale between 2 groups.

Conclusions: It should bare in mind that a clinical overlap between CFS and fibromyalgia may exist and treatment approach should be changed according to the diagnosis.

PP194

COMPLEX REGIONAL PAIN SYNDROME I IN STROKE PATIENTS

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Objectives: To investigated the incidence of Complex Regional Pain Syndrome I (CPRS), the factors influencing the development of CPRS and the relationship between CPRS and subluxation, spasticity and motor loss in the upper extremity in hemiplegic patients within the first 28 week following the stroke.

Methods: This was a prospective study. We followed up 82 patients. All patients were evaluated at weeks 2, 6, 14 and 28 after suffering stroke.

Results: The incidence of CPRS was %48.8 in the first 28 week. Significant positive correlation was found between CPRS and the presence of subluxation, Ashworth and depression score (r =0.271 p=0.014; r =0.293 p=0.008 respectively).

Conclusion: In this study, there was a relationship between CPRS and subluxation, spasticity of shoulder muscles, and muscle strength. In order to prevent the development of CRPS, exercises directed at increasing the range of motion for glenohumeral joint and strenghtening shoulder muscles and reduction of spasticity will establish the integrity

PP195

THE REHABILITATION AND MEDICAL SUPORT IN TREATMENT OF SUDECK BONE DYSTROPHY

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Rehabilitation of Sudeck bone dystrophy needs a complex physical and medical therapy, according of the stage of condition. It is manifesting in three stages, which can cross over one in other with no clear border. The therapy is based on clinical examination, bone scan and radiological findings of osteoporosis on attack region. The therapeutic management associate drag treatment (calcitonin) and rehabilitation based on specifically rules to decrease or to loose pain. The purpose of the study was to represent good clinical and radiological results after rehabilitation.

Material and method: We were following and treating with physical therapy 35 patients, 29 female and 6 male, with age of 36-70 years. The criteria for including the treatment were: 1.clinical reaction of bone dystrophy with determined stage, 2. radiological changes manifested on bones. The anamnesis data base and clinical changes, and measurements have been involved in already promoted material as: age, male, localization of the injury, the time of immobilization, starting of the treatment and the stage of the condition. The clinical observations and measurements have been followed before and after (2x20days) treatment. Radiological pictures were analyzed in a following time period: immediately after the trauma, in the beginning of therapy, and after two months of starting a therapy. The changes of the bone were registered as normal and with osteoporosis. The physical therapy is consisting of electro therapy, sonophoresis and paraffin in 3th stage.

Results: All of 35 patients, had prolonged immobilization, the changes in clinical examination and measurements before and after the 40 days of treatment are significant, $p<0.1$, analyzing the data with Chi-Square test.

Conclusion: There was a need to repeat rehabilitation for completely normalization of movement, 3-4 months, which is a relatively short, correlated with the non treated patients.

PP196

PSYCHOLOGICAL ASPECTS OF THE PAIN EXPERIENCE OF THE PATIENTS WITH INJURIES OF THE PERIPHERAL NERVOUS SYSTEM

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Objectives: The pain is very complex experience which includes cognitive, emotional and behavioural component.We have been analizing pain experience in case of patients with injuries of peripheral nervous system happened during the war in Croatia. We have been assessing pain experience shortly after the trauma, and about ten years later, when we also assessed the state of functional health.

Methods: The study included 109 patients (99 men and 10 women) with an average age of 41.85 (+/-9.06) years.For assessment of pain experience we used the Short form of McGill Pain Questionnaire (SF-MPQ) and Visual analogue scale (VAS). For functional health assessment we chose Coop/Wonca charts.

Results: The results show high intensity of pain experience in both examinations, but significantly higher ($p<0.01$) in the first situation, shortly after the trauma, then in the second one. The results of Coop/Wonca charts show moderate to severe difficulties in the physical,daily and social activities and emotions. General health of the patients mostly has been assessed as severe damaged and pain as a moderately high. Most of the patients registered no changes in their health situation lately.

Conclusions: Our study emphasizes again the importance of the psychological component in the pain experience and the efforts for assessing the pain in the process of rehabilitation.

PP197

GABAPENTIN VS. TRAMADOL IN PAINFUL DIABETIC NEUROPATHY

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Objectives: Aim of the study is to compare the efficacy and safety of gabapentin and tramadol monotherapy in painful diabetic neuropathy

Methods: A randomized 12 week, prospective trial was planned. 56 diabetic patient with pain attributed to diabetic neuropathy were included into the study. Pain intensity was assessed using Likert Pain Scale (0-4), pain relief was evaluated using Pain Relief Rating Score (0-6) and measures of quality of life were assessed with Short Form 36 (SF36). Pain charecterictics, electromyographic studies, laboratory test results were recorded. Patients were randomized to receieve either gabapentin (n:34) titrated from 900 to a maximum 2100 mg/day, or tramadol (n:22) titrated from 50 to maximum 400 mg/day.

Results: 50 patient completed the study, 6 patient discontinued because of adverse effects and other medical problems. Tramadol produced greater pain reductions than gabapentin but not statistically significant ($p>0.05$). Pain relief scores didn't differ between tramadol and gabapentin ($p>0.05$). Both drugs performed similar improvement in SF-36 measurements ($p<0.05$).

Conclusions: Both of gabapentin and tramadol are efficacious in pain, pain relief and SF-36. The most common adverse events of gabapentin were tiredness, dizziness, headache and inbalance ; tramadol's side effects were nausea, constipation, somnolance and headache. Most of them were reversible during titration phase.

PP198

FUNCTIONAL ASSESSMENT IN COMPLEX REGIONAL PAIN SYNDROME

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Objectives: The aim of this study was to reveal the deterioration in hand function in complex regional pain syndrome (CRPS) type I, and to scrutinize the possible causes of this worsening.
Methods: The Jebsen hand function (JHF) test, a work-limited standardized functional assessment test, was administered to 19 patients with CRPS type I. Results were compared with the unaffected side and normative data. Pain severity (numeric), range of motion (ROM) via flexion-distal palmar crease distance and volumetric edema measurement were obtained for all patients. Demographic data were collected. The results were compared by the the Mann-Whitney for differences between the groups.
Results: The mean age of the patient was 22.32±1.63 (range: 20-26) years. The mean duration of the disease was 3.63±1.54 months. There was a minor trauma history in 13 patients (68%). In 12 patients (63.2%) the affected extremity was dominant side. The differences in seven JHF subtests' mean time between both affected side-unaffected side and affected side-normative data were statistically significant ($p<0.05$). Pain severity and edema were like to be related with the deterioration.
Conclusions: We concluded tha the JHF test that assesses hand function in terms of simulated activity of daily living, can be used in CRPS to reveal and follow up the functional loss in hands of CRPS. Despite anatomic integrity there is a much deterioration in the hand function in CRPS. It seems that pain and edema affect the hand functions.

PP199

EVALUATION OF THE EFFECTS OF IONTOPHORESIS AND SONOPHORESIS WITH DIKLOFENAK GEL IN PATIENTS WITH POSTTRAUMATIC TENDOVAGINITIS

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Objectives: Tendovaginitis on isolated small areas around joint, muscle tendon and bones were rehabilitation on our department. The aim of our study was to evaluating the effects of iontophoresis and sonophoresis of diklofenak gel on reducing pain, palpable crepitating, swelling and increase functional capacity of treated muscle.
Material and Methods: There were treated 50 patients with posttraumatic tendovaginitis. It was observed that gel administered into the areas by means of cathode-iontophoresis and sonophoresis, after 10 days of therapy procedures. The including criteria were: 1.diagnosis of tendovaginitis, 2.physical therapy only with gel diklofenak, 3. 10 days of application, 4. 10 days less of muscles contraction. The patients were not taken any pills before and during the therapy.The patients were divided in groups by location of area. The iontophoresis with gel was application on cathode with duration of 15 min, and sonotherapy was application with doses of 0.5 W/cm, 5 min. on affected area.
Results: The frequenting of patients after therapy was: knee 10, foot 8, ankle 15, hand joint 12, hand fingers 5. The therapy was repetition by 7 patients. The data was evaluating and analyzing with Chi-Square Test and $p<0.1$ is significant. **Conclusion:** The sonotherapy and iontophoresis with gel diklofenak are an effective therapy and it was proved with goodness of local examination and forces of function capacity on treated tendon.

PP200

THE EFFECT OF TENS ON SYMPATHETIC SKIN RESPONSE

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Objectives: The aim of present study was to determine whether combination of transcutaneous electrical nerve stimulation (TENS) and acupuncture inhibits sympathetic nerve activity in healthy humans. Multiunit efferent postganglionic sympathetic activity was recorded with Toennies set.
Results: TENS in CG did not affect ST and SSR following stimulation. TENS applied at AG and NSG caused a significant increase in ST ($P=0.001$), significant increase in latency of SSR ($P=0.001$), significant decrease in amplitude of SSR ($P=0.001$) and no significant changes were observed in duration of SSR ($P>0.05$).
Conclusions: Then statistical analysis showed differences between both of groups (AG & NSG) for ST and SSR post - TENS. Transcutaneous electrical nerve stimulation inhibits sympathetic nerve activity in healthy humans.

PP201

THE EFFECTS OF US AND LASER ON ELECTROPHYSIOLOGICAL PARAMETERS OF MEDIAN NERVE IN CTS

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Objectives: The purpose of this study is to compare the therapeutic effects of Ultrasound (US) and low power laser (LPT) on the electrophysiological parameters of median nerve in carpal tunnel syndrome (CTS).
Methods: 20 subjects were participated in this study. SNAP and CMAP of median and ulnar nerves were measured. Subjects were randomly divided in two therapeutic groups. They were treated every other day for 10 sessions. Electrophysiological parameters were measured in each group in three phases, at the first session, 10th session and three weeks after treatment.
Results: In US group, there was significant differences only in the amplitude of median SNAP between 1th and 10th session ($P < 0.02$) and distal latencies between 10th session and the follow up ($P < 0.05$) . Whereas in the laser group, there was a significant difference between the first and 10th session in all parameters ($P < 0.05$) except for median sensory distal latency.
Conclusions: According to our findings, we suggest that the usage of LLLT in CTS is more effective in comparison with the US. Moreover, in some preliminary cases, we employed a combination of US and LLLT in CTS and got good clinical results.

PP202

ARE THE THERAPEUTIC MODALITIES REALLY SAFE?

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Objectives: Although the physical therapeutic modalities (PTM) are commonly used, there are very limited information about their safety

and efficiency in the literature. The aim of the current study was to evaluate the complications, adverse effects and patients' satisfaction of the PTM, in a prospective manner.

Methods: Between August 2003 and February 2004 one hundred consecutive patients who underwent PTM were enrolled into this study. All the patients fullfilled a questionnaire before and after therapy. They were asked for age, sex, height, weight, job, marital status and changes of the complaints. The PTM were carried out by the same experienced physiotherapist.

Results: There were one hundred patients (64F, 38M). The mean age was 51,14±13,42 years, mean body mass index 27,38±4,84, mean duration of hospital stay 12,64±3,95 days. Eightysix patients received hot pack, 69 ultrasound, 56 interference current therapy, 37 diadynamic electrotherapy, 26 short wave therapy, 5 whirlpool, 2 cold packs. As complications of therapeutic modalities; four patients had pain, two patients tachycardia, each one patient bleeding, allergy, hypertension and bullosis. The pain in three patients occured subsequent to exercise, and in one patient after cryotherapy. In two patients, bleeding and bullosa occured after a whirlpool therapy and deep heater resulted in tachycardia and hypertension in three patients. Allergy occured after ultrosound therapy possibly due to the gel. At the end of the therapy, six patients were very satisfied, and in 78 patients the complains were decreased. In fifteen patients, the complaints were the same as before the therapy, one patient's complaints increased.

Conclusions: This study shows that the PTM are efficient and safe in experienced hands. In the future, further investigations are needed in a greater number of patients, especially after use of different therapeutic modalities.

PP203

TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION THERAPY IN THE CHILDREN WITH NOCTURNAL ENURESIS: A PRELIMINARY REPORT

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Objectives: We evaluated the efficacy of transcutaneous nerve stimulation (TENS) therapy on wetting behaviors, social functioning and bladder storage capacities in children with enuresis nocturna

Methods: A total 8 enuretic children aged 8-16 years were selected for study on basis of poor outcome despite extensive trials of conventional treatments. 15 seances of TENS therapy applied on the suprapubic region. Changes in wetting behaviors and social functioning before and after the therapy were assessed with a 7-point scale. Patients were asked to record their urine output using a frequency/volume chart for two consecutive days before and after the therapy

Results: Two of children become dry two months after the therapy. The total scores of wetting behaviors and social status were increased in two patients at two months after the therapy. Maximum functional bladder capacity, mean day-time bladder capacity, maximum nocturnal bladder capacity were increased only in two patients after the treatment. Number of day-time voids were decreased in these patients.

Conclusions: Accoding to our preliminary results, it seems that TENS therapy in the children with nocturnal enuresis showed improvement in some degree. Further studies are needed which performed in larger series.

PP204

EXERCISE AND CERVICAL TRACTION IN CONSERVATIVE TREATMENT OF THORACIC OUTLET SYNDROME

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Objectives: The aim of this study was to investigate comparatively the effects of cervical traction and exercise in thoracic outlet syndrome (TOS).

Methods: Forty patients (25 males, 15 females, mean age= 27.2 ± 7.5) with the diagnosis of TOS were included in this study. Provocative physical maneuvers (Adson, Roose, hyperabduction, hyperextension, pectoralis minor, costoclavicular maneuvers, and pectoral and erb tenderness) were applied to all patients. Then they were randomly divided into two groups. Hot pack, traction and exercise program were applied to the patients in group I. Hot pack and exercise program were applied to the patients in group II for 10 days. Postural correction and avoidance of irritating positions were told to every patients to retrain the patient in symptom-reducing postures. Three weeks after the rehabilitation programs, provocative physical maneuvers were performed again and every patient was questioned with likert scales that included the degrees of getting better about numbness and pain such as; no cure, little, moderate, much, very much.

Results: Difference in demographic data was not statistically significant ($p>0.05$). After rehabilitation program, improvement in pectoral tenderness was not statistically significant in both groups ($p>0.05$). Patients in group I showed significant improvement in the other provocative physical maneuvers ($p<0.05$). In group II change in Roose, pectoralis minor, costoclavicular maneuver and erb tenderness were not found statistically significant ($p>0.05$). Moderate or more pain improvement was accepted significant. Improvement in pain was more likely in group I (77.7 % vs 55.5 % respectively, $p>0.05$). Difference in numbness scores between the groups was statistically significant in the favor of group I (76.4 % vs 12.5 % respectively, $p< 0.05$).

Conclusions: According to our results, both exercise and cervical traction or exercise alone can provide pain relief. However, cervical traction in addition to exercise program has beneficial effect especially on numbness in patients with TOS.

PP205

COMPARISON OF MESOTHERAPHY AND PHYSICAL THERAPY IN PATIENTS WITH LATERAL EPICONDYLITIS: A CASE CONTROLLED STUDY.

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Objectives: Although the effects of medical therapy, Physical Therapy, Lateral epicondylit (L.E) brace applications are well esthablished. The role of mesotherapy in patients with L.E is not well studied.The purpose of this study s to investigate the effect of mesotherapy in patients with L.E.

Methods:: Ninety prospectively randomized patients with L.E were divided into three groups: (1) 30 pts underwent 21 session of

physical therapy, (2)Mesotheraphy (Felden 0.5 cc+ Lidocain) were applied once a week for three sessions in 30 pts,and (3) 30 patients were followed with medical theraphy. Severity of pain were evaluated according to VAS (Visual Analog Scale).

Results: Mean age was 47-+16 (41 F, 49 m). Age,gender,mean duration of ilness, and initial pain scores were not statistically different between 3 groups ($p>0.05$). Pain scores were found significantly higher in pts with group (1) and group (3)as compared with group 2 ($p<0.001$). Howewer, in groups(1) and (3) on 2nd and 3rd follow-up were significantly improved in comparison with 1st follow-up ($p<0.001$).

Conclusions: Mean age was 47-+16 (41 F, 49 m).Age,gender,mean duration of ilness,and initial pain scores were not statistically different between 3 groups ($p>0.05$).Pain scores were found significantly higher in pts with group (1) and group (3)as compared with group 2 ($p<0.001$). Howewer ,in groups(1) and (3) on 2nd and 3rd follow-up were significantly improved in comparison with 1st follow-up ($p<0.001$).

PP206

EFFECTIVENESS OF LOW LEVEL LASER THERAPY IN THE TREATMENT OF MYOFASCIAL PAIN SYNDROME

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Objectives: Myofascial pain syndrome (MPS) is a so common clinical manifestation characterized by the presence of trigger point (TP), muscle spasm, tenderness, motion restriction, weakness and autonomic dysfunction.The main purpose of this study is to evaluate the effectiveness of low-level laser therapy on patients with MPS

Methods: 64 patients (50 women, 14 men) between 37 and 53 years old (mean age 33.1 ± 8.8), who are diagnosed MPS according to ACR criterion were included the study. The most painful three trigger points were determined. Soft Laser treatment was applied for three minutes to each TP's within 10 sessions. The evaluation was made before treatment and after treatment. No additional treatment was allowed. Pain intensity evaluation was done by using Visual Analog Scale (VAS); pain threshold evaluation was done with algometer.

Results: Mean VAS value was 89 before treatment and 24 after treatment ($p<0.01$). Mean pain threshold was 1.8 before treatment and 2.7 after treatment ($p<0.01$). Significant decrease in pain and increase in pain threshold was observed.

Conclusions: It has been concluded in this study that as a quick, noninvasive, and easily applicable treatment method, laser is as effective as the injection treatment, an invasive method. Laser treatment can be a choice of preference for it is a noninvasive method. However, further randomized and double blind research is needed in order for the efficiency of the laser treatment and its efficiency mechanisms to be better shown.

PP207

EXTRACORPOREAL SHOCK WAVE THERAPY IN MUSCULOSKELETAL SYSTEM DISEASES

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Objectives: Extracorporeal shock waves are pressure waves, which are produced out of the being and can be used for treatment when focused on any part of the body. Extracorporeal shock waves have been used for twenty years in treatment of the renal calculies and stones located in bile, pancreas and parotid gland. Recently there are new studies about extracorporeal shock wave therapy (ESWT) in different musculoskeletal system diseases.The aim of this study is to evaluate the application of ESWT in musculoskeletal system diseases.

Methods: We reviewed and annotiated the articles about the application of ESWT in locomotor system diseases.

Results: ESWT application in chronic calcific tendonitis of the shoulder, lateral and medial epicondylitis, painful heel spur, chronic plantar fasciitis, pseudoartrosis, achilles tendonitis are the most common locomotor system diseases which have been studied. ESWT is a non-invasive procedure and the complication rates are very low. Pregnancy, neoplasm, coagulopathies and anticoagulant therapy are the contraindications of the ESWT. Also ESWT should not be applied over lung, large vessels and infected skin.

Conclusions: ESWT is an effective treatment in the refractory heel pain, chronic calcific tendonitis, and chronic plantar fasciitis and can be used as an alternative for surgery and local steroid injections. The disadvantage of ESWT is it not cost effective. Many randomized controlled studies are required to confirm application of the ESWT in different locomotor system diseases.

PP208

THE LONG TERM OUTCOME OF THE BACK SCHOOL IN PATIENTS WITH CHRONIC MECHANICAL LOW BACK PAIN

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Objectives: Education is the most prominent among conservative treatment methods for chronic mechanical low back pain; the organized application of education has been conducted under the title "Back School". Our study was designed in order to demonstrate the long term outcomes of the Back School by evaluating the patients' application of what is taught in the education program to their daily life, the regularity of their exercises and the subsequent improvement in pain severity, disability and number of attacks.

Methods: 133 patients with chronic mechanical low back pain were evaluated according to the criteria before, and at least one year after the Back School treatment with a mailed questionnaire.

Results: Statistical analysis revealed that exercises were generally not taken regularly during the long term follow up, but especially higher education graduates applied what they had learned at the Back School to their daily life. Although this application did not reduce the number of attacks, it significantly decreased pain severity and reduced the disability by enabling the patient to cope with the pain.

Conclusions: It is emphasized at the conclusion of the study that the patients should be followed after their attendance in Back School and encouraged to follow what they have learned and continue with their exercises.

PP209

THE FREQUENCY AND ASSOCIATED FACTORS OF LOW BACK PAINS AMONG YOUNGER POPULATION IN TURKEY

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Objectives: Low back pain is one of the most important social problems that causes injuries in the younger population. Low back pain frequency is around 30% among adolescents and 88% of those with low back pain experiences in adolescence have low back pain in following years. Therefore, identifying and preventing the associated factors is essential for the solution of this social problem. The aims of this cross-sectional study are to determine the frequency of low back pain in the younger population and the factors that have an influence on this frequency.

Material and Methods: 1552 students from a total of 8000 who had come from all part of Turkey for university registration accepted to participate in the study and were given a questionnaire about low back pain experiences, disability and possible associated factors.

Results: Low back pain frequency was found to be 40.9%. This rate increases with age. Abandonment of moderate level physical activity, and traumas such as slipping on ice and falling down the stairs were identified as associated factors.

Conclusions: Regular physical activity and the prevention of falls might be ways for decreasing the frequency of low back pain experiences among the youth and significantly influencing the frequency of low back pain in adult population.

PP210

THE EVALUATION OF THE RELATIONSHIP BETWEEN STRAIGHT LEG RAISING TEST AND THE LEVEL AND TYPE OF HERNIATION IN ACUTE AND CHRONIC SUBJECTS WITH LUMBAR DISC HERNIATION

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Aim: The relationship between straight leg raising test (SLR) and MRI findings was investigated in subjects with acute and chronic lumbar disc herniation.

Material and Methods: In patients with lumbar disc herniation who submitted last six months, BMI, severity, location and duration of the pain, duration of the last attack, neurologic semptoms and signs, SLR, reverse Laseque test, and the level and type of the herniation were evaluated.

Results: The average ages of acute and chronic subjects were 50.43+/-8.64 and 48.92+/-10.47 years, respectively. There were 7 (6 women,1 man) subjects in the first and 36 (25 women,11 men) subjects in the second group. Age, sex and pain severity were similar in two groups. BMI, duration of the pain and duration of the last attack were differed significantly (p<0.05-0.000). 4 patients from the first group had low back-left leg pain, while 16 patients from the second have low back-both legs pain.

Neurologic semptoms and signs were higher in the chronic subjects. SLR was found positive in 3 patients from the first group and 14 patients from the second. Reverse Laseque test was negative in all patients of the first group and 34 patients of the second group. These findings were found homogeneous between two groups with no statistical significance. In MRI examination, lumbar disc herniation was found multileveled in 4 subjects of the first group and in the 22 subjects of the second group. There were bulging or protrusion in 35 subjects of chronic group. SLR was positive in the 2 patients from multileveled herniation subjects in the first group. In the second group, the test was positive in 8 patients of multileveled herniation and 6 patients of one-leveled herniation. In the subjects who have had bulging on L4-5 level, SLR was found negative in 3 patients from the first group, and 15 patients from the second group. In subjects with protrusion, the test was found negative in 1 patient from the second group and 3 patients from the second group. In patients with L5-S1 bulging, the test was found negative in 2 patients from the first group, and 7 patients from the second group. SLR was negative in 4 patients with L5-S1 protrusion from the second group.

Conclusion: Location and severity of the pain, neurologic semptoms and signs, SLR and reverse Laseque test did not not correlated with the level and type of herniation in acute and chronic subjects. Duration of the pain, duration of the last attack and BMI were significant in chronic subjects. We consider that the accurate and complete information would be achieved if the study was performed with more patient number on a longer time, especially with more acute subjects. The longer duration of pain and higher BMI's in the chronic subjects may be attributed to inadeq

PP211

INFILTRATION ANALGESIC THERAPY IN TREATMENT OF ACUTE PAIN SPINE SYNDROME

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Objectives: Acute spine syndrome is manifesting with pain and dysfunction in attacked spine part, it is following with pain scoliosis with or with out of radix changes. Acute spine syndrome is general knowing, it is causality for shortage of work condition. The purpose is to present the effectiveness of infiltration analgesic and anti inflammatory therapy in treatment of acute spine syndrome, by less of pain, mobilization of patient and shorter time of rehabilitation.

Material and method: there were treated 28 patients, with age of 30-70 years, 12 female and 16 male, with non specific acute spine syndrome. The infiltration analgesic and anti inflammatory therapy was application, vertebral on attacked radix. The rehabilitation with electro therapy, medical and hydro gymnastic was followed, after 3 days of application.

Results: whole 28 patients were filing better, subjective and in clinical examination after 3 days of application. The patients were with better mobility, reduction of pain and less of neurological deficit before physical therapy compare with that before application. For relative short time 10-20 days after rehabilitation they were in working condition. The rehabilitation program was repeated only by 4 patients in same year, the repeat of acute spine syndrome, was not in any one patient.

Conclusion: Infiltration analgesic therapy and rehabilitation, who were done, is giving a good therapy results prove by less of pain, whole patient mobility with out of neurological deficits for relative short period of rehabilitation.

PP212

THE EFFICACY OF CALCITONIN IN THE TREATMENT OF LUMBAR SPINAL STENOSIS

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Objectives: The purpose of the study was to compare the efficacy of physical therapy alone with the efficacy of physical therapy and calcitonin in patients with neurogenic claudication.

Methods: In this single blind, randomized study, patients with lumbar spinal canal stenosis diagnosed by MRI and having neurogenic claudication were included. Patient with a history of spinal surgery, inflammatory, infectious or metastatic disease were

excluded. Patients were observed for 8 weeks and evaluated before and after treatment at the 8th week. Patients were randomized between the salmon calcitonin 200U/day + physical therapy (n=23) and parasetamol 1500mg/day + physical therapy (n=22) treatments groups. Both groups received the same physical therapy (interferential current + hotpack + short wave) and exercise (pelvic tilt, abdominal muscle strengthening, streching and mobilisation) protocol. The association of various clinical and functional parameters was assessed statistically by GraphPad Prisma V3 pocket programme using paired and unpaired t test, chi square test and McNemar's test. $p<0,05$ indicated statistical significance.

Results: Mean age of the patients in Group1 (calcitonin)was 57,6±11,2 and in Group2 (paracetamol) 54,5±10,6 years. Before treatment there were no significant difference between groups with respect to age, BMI, spinal axial diameter, VAS, spinal mobility, functional status and walking distance ($p>0,05$). After 8 weeks of treatment, both groups have benefited significantly with respect to VAS, functional status and walking distance ($p<0,001$). There was no statistically significant difference between in group changes ($p>0,05$).

Conclusions: In 45 patients with lumbar spinal stenosis with a 8 week treatment period, concomitant use of calcitonin nasal spray with physical therapy and exercise did not have any benefical effect on the patient's functional status, lumbar mobility and walking distance.

PP213

FAILED BACK SURGERY SYNDROME: CLINICAL EVALUATION

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Objectives: Failed back surgery syndrome (FBSS) is a common disorder. Its diagnosis and treatment may have some difficulties. In the current study, patients with FBSS were evaluated between April 2003-March 2004.

Methods: The evaluation criteria were demographic data, duration of back pain, level of operations, whether the patients underwent physical therapeutic modalities (PTM) prior or after surgery, MRI images after surgery.

Results: There were 35 patients (25 female, 10 male). The mean age was 49,37±10,12 years, mean body mass index 28,60±3,78. The mean duration of back pain was 12,08±8,24 years. All the patients underwent discectomy and laminectomy. In 22 patients, only one, in 13 patients two discs were operated. Thirteen patients received PTM prior to surgery, 22 patients did not. The number of operations per patient were as follows: In 21 patients once, in 9 patients twice, in three patients 3 times and in each 1 patients 5 and 7 times. In 19 patients, the operation was performed more than two years ago. Twentythree patients had a continious pain, whereas 12 patients had an intermittant pain. Twenty patients received PTM after surgery. The operated discs were L4-5 in 24 patients, L5-S1 in 14, L3-L4 levels in the 4 patients. When the etiologies of FBSS were evaluated, 8 patients had granulations, 5 patients had various disc pathologies, 6 patients recurrences, 4 patients spinal stenosis, 7 patients s! evere degeneration and 1 patient inflamation.

Conclusions: The evaluations of the patients with FBSS should be made carefully prior the surgery, since only a small percent of patients with low back pain require a surgical intervention. The postoperative follow up should also be performed very closely. A multidisciplinary approach to the patients with low back pain should be carried out for the decision making.

PP214

LOW BACK PAIN IN THE NURSING PROFESSION

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Objectives: This study was planned to evaluate low back pain (LBP) among nurses. The effects of personal characteristics, habits and work conditions on LBP were invastigated.

Methods: The study was conducted on 209 nurses from all departments. Educational level, age, marital status and number of births were questioned. The BMI was measured. To evaluate occupational LBP a Low Back Pain Evaluation Form, which consisted of 4 sections and 31 questions (personal characteristics; occupational information; questions about work activities; history of LBP and work disability) was used.The functional evaluation included madified Oswestry Disability Questionnaire, Zung Depression Scale and VAS for pain.

Results: Mean age was 32.99(± 8.28). 73.2% (n=153) had LBP. LBP was acute in 81% and chronic in 19%. There was no significant relationship between LBP and age, BMI, marital status, education and number of births. There was significant relationship between LBP and departmental work conditions. While LBP on nurses working in operating room and reanimation was 63.4%, it was 34.0% in outpatient clinics workers. There was significant relationship between LBP and smoking, coffee usage, comorbidity, lifting over 10 kg, working in standing or bending position, performing pushing and pulling and positioning patients in bed. There was no significant relationship with adaptation at work, adaptation with colleagues, conflicts with their superiors and working in sitting position. VAS pain score and Oswestry score were significantly higher in the chronic LBP group.There was no significant difference in depression between the LBP group and the non-LBP group; and also between the acute and chronic LBP group.

Conclusions: This study proved the high risk of LBP in nursing profession. There is need for an effective LBP training program for nurses to get a better health service.

PP215

ROLE OF OBESITY IN LOW BACK PAIN ORIENTED DISABILITY

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Objectives: Musculoskeletal disorders and related disability are relatively common and obesity has been shown to contribute an independent risk for back pain. Obesity is also a reason for limitations in physical functioning and everyday life. Our aim in this study was to examine the associations between obesity and disability oriented by low back pain through functional tools like Quebec Back Pain Disability Scale and Oswestry Disability Questionnaire.

Methods: Sixty patients with loe pack without neuological impariment were included in the study. We grouped our patients as the obese group (group O) and the nonobese group (groupN) according to body mass index (BMI). Patients with BMI greater than 30 were accepted as obese. The Quebec Back Pain Disability Scale and Oswestry Disability Questionnaire were used to objectively assess the functional impariment. Visual Analog Scale (VAS) was used to inquire pain intensity. Comparison of demographic data, levels of disability and pain between groups were computed descriptive statistical analysis and nonparametric tests.

Results: Group O consisted of 14 obese low back patients whereas 46 patients had a BMI<30 (group N). There was no significant

difference for age, disease duration and gender distribution between groups. We observed significant difference between OSWESTRY and Quebec disability scores of obese and nonobese patients. No such difference could be demonstrated for VAS. Presence of obesity displayed good correlation with indicators of disability whereas no such correlation could be demonstrated with VAS.

Conclusions: In the light of our findings we suggest that patients with low back pain do not suffer from worse if they were obese but they have risk to experience a more disabled life due to their weight.

PP216

CONSIDER THE EFFICACY OF DYNAMIC STABILIZATION EXERCISE ON PARA VERTEBRAL MUSCLE FATIGABILITY IN MECHANICAL CLBP

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Objectives: The aim of this study was to determine the effect of stabilization exercise on Para- vertebral muscle fatigability in patient with CLBP

Methods: 10 patient (mean age 32+/-6 with chronic mechanical LBP with at least12 months positive history of LBP invited to participate to this study. Para vertebral muscle fatigability tested with modified Sorensen test and borge scale before and after treatment. stabilization exercisehad done for 12weeks in two sets of 6week ,first 6week every day and second 6week every other day (3 days in week)repeatability of all data was tested.

Results: Data showed that After 3 week Para vertebral muscle fatigue decrease and effect of exercise existeven one month after ending of treatment

Conclusions: Stabilization exercise not only could dirct efficacy to lumbar and abdominal muscle ,but also increase muscle oxidative capacity may be due to decrease of pain severity ,and enhance loading response of muscles

PP217

FREQUENCY OF LOW BACK PAIN IN COAL MINERS

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Objectives: It is known that coal miners have a higher prevalence of low back pain. This study was planned to determine the prevalence of low back pain and disability in coal miners.

Methods: 50 underground workers (group I) and 38 age matched surface workers (group II) were included the study. Duration of work, suffering from low back pain, smoking and alchol habbits, occupational injury and operation, number of medical care and medication due to low back pain in the last six month were recorded. Height and weight were measured and body mass index (BMI) of all subjects were calculated. Low back pain was evaluated by 10 mm visual analog scale and Modified Oswestry Low Back Pain Disability Questionnaire. Anteroposterior and lateral lumbosacral X-rays were performed. Ferguson and lumbosacral angles were measured, congenital anomalies and degenerative findings were recorded.

Results: All of the underground workers were faceworker and all of the surface workers were lifting the heavy objects in their occupation. Mean age of group I and group II were 42.2 ± 4.0 and 41.2 ± 6.1, respectively. There was no difference in age, BMI and duration of work between two groups. 39 men (78 %)in group I and 12 men (32.4 %)in group II were suffering from low back pain. Statisticaly significant difference was found between two groups ($p< 0.001$). Mean VAS score was found higher in group I than group II ($p< 0.05$). There was no difference in mean Oswestry Low Back Pain Disability Questionnaire score between two groups . There was a correlation between VAS and Oswestry Low Back Pain Disability Questionnaire ($p= 0.001$, $r = 0.47$). Number of spinal operation and spinal trauma was higher in group I than group II (9 vs 2, 7 vs 2, respectively). Mean Ferguson angle was found higher in group II than group I ($p = 0.02$). There was no relation between ferguson and lumbosacral angle and low back pain.

Conclusions: Low back pain is a very common disease in coal miners but working with inappropriate positions seems to be a more important factor than heavy lifting in coal miners.

PP218

A COMPARISON OF THE OPERATED LUMBAR DISC HERNIA PATIENTS VERSUS NON-OPERATED

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Objectives: The aim of this study was to compare the demographic features ,history, physical examination findings, Oswestry Disability Index and Beck Depression Scale results in operated lumbar disc hernia patients versus non-operated attending the 3rd Physical and Rehabilitation Medicine outpatient clinic.

Methods: A total of 100 consecutive patients, including 51 operated (mean age 52.8±1.46)and 49 non-operated (mean age 40.4±16.2) attending outpatient clinic since year 2002 were included in the study.

Results: Body mass index, smoking, trauma history, visual analog scale and Oswestry Pain Index were statistically insignificant between the two groups ($p>0.05$). Age, non-steroidal anti-inflammatory usage, Istanbul Pain Scale and Beck Depression Scale were significantly higher in the operated group than in the non-operated group. Meanwhile education level,regular exercise and attendance to physiotherapy program frequency were significantly lower in the operated group than in the non-operated group.

Conclusions: Failure in the conservative management and resultant interventional approach to lumbar disc hernia may coincide with psychosocial changes in this patient group. A multidisciplinary approach including psychiatric evaluation should be considered in the operated lumbar disc hernia patients.

PP219

THE RELATIONSHIP BETWEEN PAIN AND PSYCHOLOGICAL FACTORS AFTER LUMBAR DISC SURGERY

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Objectives: The purpose of this study is to investigate whether patients with failed back surgery have different psychological aspects and exacerbate pain

Methods: Forty five patients with failed back surgery (FBS) and 30 healthy controls were enrolled in the study. In patients with FBS, the presence and severity of epidural fibrosis was determined with contrast- enhanced magnetic resonance imaging (MRI). The patients with FBS were grouped according to presence of epidural fibrosis. A pain visual analog scale (VAS) and Oswestry Low Back Disability Questionnaire (ODQ) were completed. The psychological aspect was assessed with the symptom Checklist (SCL-90) and for health related of life was evaluated with Short Form -36 General Health Survey (SF_36) was full filled by all the participants

Results: Neither ODQ scores, VAS or SCL-90 scores differed significantly between the patients epidural fibrosis and without fibrosis. But SCL -90 and SF-36 scores were significantly different in patients with FBS compared to healthy controls.

Conclusions: FBS patients reported higher levels of general maladjustment and affective distress than healthy controls, including anxiety, depressive symtomatology, somatisation.

PP220

REHABILITATION OF PATIENTS AFTER LUMBAR DISCUS HERNIA OPERATION

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Objectives: It is important for patients who were operated on for lumbar discus hernia to be enabled for their professional and life activities. Because of that they have to have the rehabilitation treatment after the operation. The aim of this study was to show why the rehabilitation treatment for patients who were operated on for lumbar discus hernia is necessary and to show the effectiveness of our rehabilitation program.

Methods: We included 99 patients, both sex, mean age 45, who had come to our rehabilitation center in average 63 days after the operation and who had 19 days long treatment in our institution. All of them had kinesi treatment in kinesi room, 95.95 % of them had hydro therapy in thermo - mineral whether in a pool or in a bathtub and 42.42 % had mud therapy with sulfuric peloid pack. Other physical procedures were given according to the patient's clinical condition. Patients were clinically examined by doctor at the beginning ant at the end of their treatment. On admission and at discharge we took Schober index.

Results: At the end of the rehabilitation treatment the index of sagittal movement were significantly increased in relation to the state before hydro – peloid – kinesi therapy and we had only two patients who had pains. Results of the treatment: excellent – 41 %, good – 54 %, satisfied – 3%, unsatisfied – 2 %.

Conclusions: We recommended our patients to continue with exercises every day at home, to take care about their protecting movements and conditions and give them an advice about professional orientation. Our experience shows that the patients have to come for rehabilitation 3 – 4 weeks after the operation, stay three weeks for the complete treatment and come back six months after.

PP221

SPONTANEAOUS REGRESSION OF HERNIATED LUMBAR DISC. A CASE REPORT

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Objectives: To clarify the effect of conservative therapy on extruded lumbar disc.

Methods: A 37-year-old female was seen with a large lumbar disc herniation at the L5-S1 level on a magnetic resonance image. She had severe low back pain and right leg pain but she had no neurologic deficit. With medical therapy and rest her symptoms didn't decrease. Neurosurgeons offered discectomy but she refused. After 6 months observation, her symptoms subsided almost totally and follow up MRI showed spontaneous regression of extruded disc.

Results: Conservative therapy should be considered for treatment of extruded lumbar disc..

Conclusions: Nonsurgical conservative observation should be considered an option for treatment in the patient with extruded disc who had no neurologic deficit.

PP222

COEXISTENCE OF THORACAL EPIDURAL LIPOMA AND CERVICOTHORACAL SYRINGOMYELIA IN A PATIENT WITH BACK PAIN: A CASE REPORT

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Objectives: Lipomas are rare tumors of spinal cord and constitutes 1% of all spinal cord tumors. Pain and progressive neurologic deficits may develop seldomly. Syringomyelia is a disease in which loss of pain and temperature sensation, usually in distal upper extremities is seen and usually it is associated with the developmental anomalies of the foramen magnum, spinal cord tumors or as a late complication of spinal cord trauma; though is idiopathic in some cases. Clinical Features include segmental or radicular pain, late motor and sensory loss, increased spasticity and hyperhydrosis. Here we present a case with thoracal epidural lipoma and coexistent cervicothoracal syringomyelia.

Methods: Fifty three year old male patient was admitted to our hospital with complaint of back pain for 5 years. He also defined having neck pain which was radiating towards his right shoulder and numbness in his fingertips. In his past medical history; he described having partial thyroidectomy operation and right vocal cord paralysis 2 years ago. He didn't describe any trauma history. His physical examination was normal. In his neurologic examination; deep tendon reflexes were found to be diminished in his upper extremities despite normal strength, normal muscle tonus and normal pain and temperature sensation. Magnetic resonance imaging of cervical and thoracal region was performed and lipoma extending from thoracal 4 to thoracal 7 vertebrae level, with a thickness of 5 mm, which was located at the left posterolateral epidural space (Figure 1-3) and syringomyelia extending from upper cervical level to thoracal 11 vertebra level were detected (Figure 4).

Conclusions: We aimed to present this case since thoracal epidural lipoma and cervicothoracal syringomyelia are both rarely seen conditions and coexistence is uncommon.

PP223

A RARE CAUSE OF SUBACUTE MYELOPATHY: FOIX ALAJOUANINE SYNDROME

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Objectives: Vascular pathologies of spinal cord are extremely rare and difficult to diagnose. A case of Foix Alajouanine Syndrome causing ischemic subacute myelopathy is presented.

Methods: A 55 year old male patient presented with acute, moderate low back pain , numbness and weakness in legs and urinary incontinence of recent onset. The patient had a history of episodic coccygeal pain, difficulty in urination for 2 years. Urological assesment was normal. Physical examination revealed a slight decrease in lower extremity strength, sensory loss below T12-L1, increase in deep tendon reflexes and a positive Babinski sign bilaterally. Periods of improvement and deterioration of symptoms and signs were reported on clinical follow up and complete paraplegia developed in one month. Magnetic Resonance Imaging demonstrated lower thoracal dural arteriovenous fistulae, myelopathy and infarction due to venous stasis. Dilated venous structures extending between T4-L1, dural arteriovenous fistulae with two feeding arteries at right T5-7 level were found on angiography and these arteries were ligated by neurosurgeons without apparent clinical benefit .

Conclusions: Foix Alajouanine Syndrome is a vascular malformation of duramater which can be confused with other causes of subacute myelopathy such as spinal stenosis, disc herniation, and spinal cord tumors. The prognosis is satisfactory with early diagnosis and immediate surgery. Therefore it is important to keep vascular abnormalities in mind and consider in differential diagnosis in patients with subacute neurological impairment in lower extremities.

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THE RELATIONSHIP BETWEEN PAIN, DISABILITY AND DEPRESSION IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Objectives: The aim of this study was to assess the relationship between pain, disability, and depression in patients with chronic low back pain.

Methods: Fifty-five patients (43 female, 12 male) with a mean age of 40.2±8.4 years with chronic low back pain (3-180 months) were included in the study. Pain intensity was evaluated with visual analog scale (VAS, 0-100 mm), disability was assessed by Roland Morris Scale (RM), and Beck Depression Inventory (BDI) and General Health Questionnaire (GHQ) were used for depression screening.

Results: The mean VAS for pain was 58.1±21.6. The mean RMS score, GHQ score, BDI score were 12.5±6.3, 14.1±6.8 and 13.1±8.9, respectively. 32 (58 %) patients were normal, 15 (27 %) had mild, 7 (13 %) had moderate and one (2 %) had severe depression according to the BDI subgroup evaluation. Disease duration was positively correlated with RM score (r=0.28, p=0.04) and BDI score (r=0.35, p=0.008). There was a positive correlation between pain intensity and Rolland Morris score (r=0.46, p=0.0001), GHQ was positively correlated with Beck depression score (r=0.63, p=0.0001) and Rolland Morris score (r=0.38, p=0.004). Beck depression score was correlated with Roland Morris Score (r=0.42, p=0.001).

Conclusions: Patients with chronic low back pain seem to have symptoms of depression and their depressive state correlate with their pain level and disability status. This results supports the necessity of multimodal approach to the patient with chronic low back pain.