

Individualized exercises: To whom and when

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All physiatrists have the unique qualification and broad knowledge to prescribe accurate and research-based exercises to people with disabilities, chronic disease and to those who carry the risk of chronic disease as well as to those who are healthy but inactive. Exercises are prescribed for wellness, health maintenance, cardioprotection, weight loss, optimum musculoskeletal and cardiovascular fitness for the healthy and injury and disability treatment for chronic diseases like traumatic brain injury (TBI), spinal cord injury (SCI), obesity, diabetes, osteoporosis and cancer. A low level of physical activity is stated to expose a person to a greater risk of dying than even the risk of smoking, hypertension or obesity which points to the importance of activity to maintain health and reduce all-cause morbidity and mortality in healthy but inactive people. Exercise is defined as the systemic performance of planned physical movements to maintain health, prevent impairments, reduce risk and enhance fitness. Exercises should be prescribed in direct recommendation and the physiatrist should know the basic principles of exercise physiology such as VO₂ max, cardiac output, arterial-venous difference, intensity, frequency and timing of sessions. Exercises increase physical capacity in both the healthy and the disabled and improve ADL and independence with positive effects in diseases, impairments and general health. The less recognized positive effects of exercise are emotional, psychological and social functions. Aerobic exercise can produce anxiety reduction, improve brain functions and learning. Yet the benefits of exercise can vary individually, over time and in different internal and external situations and influences. When prescribing exercises for the elderly the physiatrist should note the barriers to exercise, the general health and comorbidities of the patient. Geriatric patients have better outcomes in cardiovascular disease, diabetes mellitus, osteoporosis and osteoarthritis with exercise training. Muscle strength is improved and BDI scores and depressive symptoms are reduced, age-related 10% decline in aerobic capacity can be reversed and all-cause mortality decreased. Obesity is a strong risk factor for poor health, reduced functional capacity, poor QoL and a prominent risk factor for increased morbidity where the risk increases linearly with BMI. Obesity with aging is defined as sarcopenic obesity and obese people benefit from aerobic exercises of 50-70% VO₂ max monitored by RPE for 20-30 min/day, 5 days/wk 40-70% THR plus flexibility exercises 5 sessions/wk with caloric intake reduction for effective weight loss. In cancer patients exercises can improve survivorship, prognostic outcomes and decrease disease recurrence and should be adapted to the individual survivor, health status, treatment received and anticipated disease trajectory. Exercises reduce the risk for breast, colon, prostate, endometrium cancer and cancer-related fatigue and these have been confirmed by ACS. In TBI the patients may have physical, cognitive, emotional and behavioral symptoms depending on the severity, general health and age factors. It has been demonstrated both in animals and humans that exercises induce upregulation of neurotrophic factors among which brain derived neurotrophic factor (BDNF) is the most important. BDNF induces improvement in memory and learning due to effects in hippocampus. Yet in early post-TBI the brain is most sensitive to metabolic demands like exercise, they should be started two weeks after TBI induction. In SCI disability, inactivity, increased risk for morbidity and mortality and psychological factors like depression, anxiety and chronic pain can all be reduced by exercises. Increased muscular strength in the uninvolved extremities leads to improved performance in sports activities like wheel-chair basketball and tennis. Paralympic athletes with SCI have improved wheel-chair mobility skills and sports participation improves BMD as well as psychological well-being. The risk for cardiovascular disease, which is the leading cause of death in SCI after 50 years is also reduced by exercises.

Exercise of all modalities, tailored to individual requirements is a non-invasive, non-pharmacological intervention, a valuable tool for preventing disease, reducing risk factors and disability and QoL and should be prescribed for the ill and the healthy.

Man as biological machine

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Abstract

The dominant medical paradigm is bio-medical. Medicine is mostly seen either as biology applied to humans or the organisation of technical services to the community (hospitals, vaccinations, prevention etc.). Both approaches share the assumption that individuals are replicable units: no matter if they are members of a population of cells or of persons. This approach stems from the determinist-reductionist paradigm of modern science (1), which implies that “causes” are hidden beneath the “phenomena” (cells are hidden beneath tissues, molecules beneath cells etc.) and that the whole can be understood if one looks at its parts. The parts are assumed to be replicable tiles of a mosaic. In this view, man is a biological machine. The progress of technology is reinforcing the myth of the capacity of man to create machines behaving like men (see the history of automata and the many science-fiction novels and movies on humanoids) (2). If one can create a man, this warrants that one has a limitless capacity to repair him/herself and ultimately reach immortality. Hospitals must resemble repair shops, not caring homes. On the flip side of the same coin, angst is unavoidable due to the fear of being nothing else than a machine, without freedom and devoid of any real identity (3). This has profound consequences on medicine. Its clinical mission, the work of listening to and curing the ill or disabled person, is falling progressively into scientific disrepute (4). *Clinein*, in Greek, means leaning – namely towards a single bedridden person. For this reason, paradoxically, biomedicine and public health predominate. The merits of the man-machine metaphor are huge: suffice it to remind that as a paradigm it led to the enormous successes against infectious diseases due to a successful mix of biological research and public health policies. Yet, once the metaphor changed into a myth it failed to face whole-person problems like psychiatric illnesses, acute and chronic disabilities, ageing problems and terminal conditions. In these cases, the patient must be considered as a unique entity, the physician-patient relationship is an essential ingredient of the therapy and no real “cure” exists (in the sense of perfect “repair”), whereas caring (helping the patient to feel better) is always possible (5). The clinical model is thus more and more diverging from the biomedical model; is this heralding the expulsion of clinical medicine and related specialties (physical medicine and rehabilitation, psychiatry and the like) from the family of sciences? Are the clinicians becoming the “good-hearted” while biologists, surgeons and epidemiologists will remain the “clever guys” (4)? The medical model should recuperate its original scientific high ranking – mostly through innovative teaching models, starting from the academic level. To achieve that, several steps are needed: (a) research should respect the specificity of the medical model; (b) that model must remain within the boundaries of the contemporary scientific model; (c) upgrading cannot be done simply by adding ethical constraints or claiming that medicine is “more than science”; (d) advanced research instruments and methods should be borrowed whenever possible from the social sciences (6); (e) inductive reasoning, behavioural research methods, teaching and psychological skills should become explicit components of the clinicians’ curriculum (7, 8, 9); and (f) medical training should provide that there be early branching into biomedical, clinical and population health specialisations. Clinical specialisations should be organised into areas sharing the level of interpersonal relationship rather than technical peculiarities (10). There is no cleavage between science and assistance: simply, the science of assistance should be developed (11,12).

Key words: Medicine, biology, paradigms, clinical medicine, biomedicine, public health, scientific model, physicianpatient relationship, medical specialisations, education and training.

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Experimental therapeutic modalities in stroke rehabilitation

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Aim: To present a comprehensive model for the assessment of novel experimental modalities aimed to manipulate brain plasticity in the rehabilitation of stroke patients.

Background:

Neural networks show a remarkable re-modelling capacity after focal damage affecting one or more of their components. Understanding the characteristics of this process, its constraints, its longitudinal course following the onset of stroke or TBI, and the way it is affected by external interventions, is of utmost importance for rehabilitation medicine. The lecture will start with a review of empirical findings pointing to specific patterns of cortical re-organization underlying restoration of function after brain damage. This review will serve as a theoretical background for presentation of data obtained in on-going studies conducted in our department. In these studies we aim to facilitate the formation of desirable patterns of re-organization by non-invasive manipulation of regional cortical excitability and to clarify the effects of lesions to different parts of the cortical mantle on the likelihood of obtaining good results with these therapeutic modalities.

Methods: The following assessment methods will be discussed: (i) Structure-function relationship analysis employing normalization procedures to overcome the problem of inter-personal variance in brain morphometrics and enable group statistics; (ii) Functional analysis employing theory-motivated assessment of discrete operations in different domains of brain function, especially motor control and attention; (iii) Mathematical modeling using Multi-Perturbation Analysis (MPA) to study the relative impact of damage to various brain regions on the global function of distributed networks; (iv) Electrophysiological monitoring of the neurophysiological effects of different therapeutic modalities. The application of the above assessment methods will be shown in on-going studies using: (i) action observation (AO) and (ii) mirror therapy (MT) for recruitment of the human mirror-neuron system (hMNS) to facilitate motor re-learning in hemiparetic patients, and (iii) EEG-biofeedback to increase cortical arousal in spared regions of the network mediating spatial attention, in patients with neglect.

Results: The combined application of the above assessment methods revealed interesting new information, contributing to the understanding of the brain mechanisms involved in normal and pathological functioning in these domains, and it shed new light on the neurophysiological response to these therapeutic modalities. The results will be discussed in detail in separate presentations during the EFRR congress. Here is just a brief overview: In the case of action observation (AO) we could show that μ (8-12 Hz) suppression is a valid EEG marker of hMNS recruitment, that is suitable for use in the rehabilitation setting. Moreover, we found a functional distinction between the higher and lower segments of the μ range, where only suppression of the latter seem to be associated with activation of the hMNS. Despite the fact that AO is a visual task, the suppression recorded from central (sensory-motor) sites was greater than from occipital sites. In stroke patients, AO revealed less suppression in the affected hemisphere compared to the non-affected hemisphere. Suppression in the lower μ range was negatively correlated with lesion extent within the inferior parietal cortex, a region where damage often results in motor-control disorders (apraxia), and where large aggregates of mirror neurons were found in macaque monkeys. In the case of mirror therapy (MT) we could show, by monitoring the amount of event-related de-synchronization (ERD) in different phases of the motor act (timed-locked to EMG activity), that MT induces a remarkable change in inter-hemispheric dynamics. This is reflected in an almost complete abolishment of lateralization effects on the magnitude of ERD when a subject observes his own moving right/left hand in a mid-sagittal mirror creating an illusion of movement in the opposite hand.

In the case of EEG-biofeedback we could show that stroke patients with spatial neglect can modulate regional cortical arousal when they receive a visual feedback on the beta/theta ratio in that region (the target synaptic space in our experiments was the superior parietal cortex housing the putative dorsal attention network). Most patients performed better after treatment when tested in a computerized visual search task. However, large intra-personal and inter-personal variance makes it difficult at this point to provide a coherent explanation for the treatment effects obtained.

Conclusion: The current practice in rehabilitation of stroke/TBI patients is based largely on traditional therapies, in which efficacy is judged by the results of large-scale randomized controlled trials. The introduction into clinical practice of novel modalities, currently in the experimental stage, is expected to enhance the rehabilitation outcome of these patients. Promising results were obtained in recent years with several theory-driven modalities aiming to facilitate restoration of lost functions by manipulating the patterns of cortical re-organization following brain damage. Given the limitation in our current understanding of the physiological processes involved, it is necessary that prior to the employment of such interventions in routine practice, better knowledge is gained on constraints imposed by lesions to specific parts of the brain, and by the temporal course of re-organization processes naturally occurring after the onset of damage. The combined application of normalization procedures for the analysis of lesion effects, behavioral testing, and electrophysiological monitoring, provides a setup suitable for comprehensive assessment of novel therapies within the rehabilitation department.

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Rehabilitation of patients with arthritis; Do we need specific recommendations?

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In the last two decades, there are revolutionary developments in the treatment of rheumatic diseases. Today, clinicians could achieve the higher rates of remission with these innovative medicines in patients with rheumatic disorders. These new targeted therapies named this era the "biologic era". However, these treatment modalities are inevitably expensive and begin to overload the health budgets. Most of the countries set up strict national rules for the use of biologic agents in disease states and these rules are generally in accordance with the internationally accepted recommendations or guidelines. In the field of rheumatology, both European League of Associations against Rheumatism (EULAR) and American College of Rheumatology (ACR) regularly published recommendations for the treatment of rheumatic diseases including the use of biologic agents. Sometimes international societies like Assessment of Spondyloarthritis international Society (ASAS) or others collaborate with EULAR or ACR to build up recommendations or guidelines.

Despite these evolutionary developments in pharmacologic or targeted therapies, non-pharmacologic therapies, particularly physiotherapy and rehabilitation, in rheumatic diseases could not achieve big steps forward. There are some efforts to build up disease specific recommendations for physical therapy and rehabilitation of rheumatic diseases, however these are seldom rare. New publications in the field underscore the necessity and importance of combined use of pharmacotherapy with rehabilitation and physiotherapy modalities in rheumatic diseases. In ankylosing spondylitis, rehabilitation techniques combined with biologic treatments achieved better results. Also, EULAR recommendations for non-pharmacological therapies in knee and hip osteoarthritis have been recently published. New data and efforts from major societies strongly suggest that we need disease specific recommendations for physiotherapy and rehabilitation of rheumatic disorders.

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Extracorporeal shock wave therapy in the treatment of chronic tendinopathies and osteoarthritis

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

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

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

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

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

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Driving assessment - Integral part of the rehabilitation process

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Objective: Foreign and our experiences with assessing driving abilities, including car adaptations for drivers with disabilities will be presented.

The ability of a person with disability to drive a car depends not only on the diagnosis but also on the functional consequences of a disease or injury, which have to be carefully evaluated. Assessment of patients' driving ability is a very complex and difficult task for which a multidisciplinary team is needed. Enabling the patient to drive a car is an integral part of a complex rehabilitation. The ability to drive a car improves the patient's quality of life as he/she is less dependent on other people's help, is more socially active and has more opportunities for education, employment, attendance of cultural and sport events.

Strokes are a common cause of disability and the most common reason for driving assessment referrals. Driving assessment has to pay particular attention to the presence of persisting problems with vision memory, concentration, reasoning ability or visuospatial problems, poorly controlled spasms, slow reactions, speech and language problems, etc.

Traumatic Brain Injuries are a common reason for driving assessment referrals. People with mild TBI may exhibit a wider range of problems than would be anticipated from the injury but more severe TBIs have a complex mixture of physical, cognitive and behavioural sequelae. Outcome (including that of driving assessment) depends on severity of the brain damage, type of lesion, nature of physical, cognitive, emotional and behavioural disorders, premorbid personality, family and social support network, effectiveness of therapy, occurrence of post traumatic epilepsy, and its control, the passage of time, in car findings.

Cognitive tests cannot reliably predict fitness to drive in those who are realistic candidates for a driving assessment because there are large differences in the compensatory strategies used by individuals. Tests measure cognitive skills in standard situations, but in real-life conditions people can draw from other skills to compensate for their own deficits. Compensation skills are dependent on the relative integrity of the unaffected functions and other factors that cannot always be identified.

For persons with limb amputation driver's training is recommended as a part of advanced prosthetic training and rehabilitation. It has to include driver's evaluation, identification of appropriate vehicle modification equipment and training with adaptive driving equipment.

Conclusion: Within the European Union around three million driving licences holders are disabled. This figure represents nearly 1% of all EU-drivers. As a part of the modern life style, ability to drive enhances a person's participation. For persons with disability, driving preserves their independence, and improves their self-esteem.

Key words: Drivers with disabilities, assessment, car adaptation.

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Medical challenges during traumatic brain injury rehabilitation

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Medical complications due to traumatic brain injury may have a negative effect on both the functional status and the duration of hospital stay; therefore, in order to prevent such complications, rehabilitation of the brain injured patients should begin during the critical care. It has been shown persons with traumatic brain injury whom were consulted to a rehabilitation physician in the early period had better outcomes and shorter periods of hospital stay.

The rehabilitation centers are usually located separately from the general hospitals, thus patients may not always reach a center after intensive care easily. Accordingly, the onset of rehabilitation may delay and relevant complications would rather ensue.

This lecture will cover the medical complications such as dysphagia, urinary and faecal incontinence, spasticity, contractures, pressure ulcer, deep vein thrombosis, pulmonary embolism, heterotopic ossification, hydrocephalus, fluid-electrolyte imbalances, hormone deficiencies and posttraumatic seizures encountered during the inpatient rehabilitation session and the importance of the effective rehabilitation.

The effect of repetitive bilateral ARM training with rhythmic auditory cueing on motor performance and central motor changes in patients with chronic stroke

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Background: Upper extremity (UE) hemiparesis is the most common post-stroke disability. It has been reported that 30–66% of individuals with hemiparesis have poor arm function 6 months post-stroke. However, there is evidence that specific rehabilitation intervention can improve UE motor performance (MP) in chronic stroke survivors. Bilateral arm training with rhythmic auditory cueing (BATRAC) has been used in stroke rehabilitation with encouraging outcome. However, its efficacy needs further investigations. A study was done in Alexandria University hospitals to verify the efficacy of BATRAC in stroke patients; and to explore its relation to central changes.

Objective: To investigate the effects of BATRAC versus control intervention (CI) on both UE MP and motor evoked potential (MEP) in patients with chronic stroke. **Subjects and Methods:** 76 patients (mean age=50.2±6.2 years) with chronic stroke (disease duration = 6-67 months after stroke onset) were enrolled. Patients were randomized to receive either BATRAC (n=40), with both UE trained simultaneously in symmetric and asymmetric patterns, or CI (n=36) in the form of traditional therapeutic exercises. Intervention was done for one hour/day, 3 days/week for 8 weeks in both groups. Assessment of MP and MEP was done immediately before and after intervention. Outcome measures included: 1) Fugl-Meyer MP test for the UE (FM-UE); and 2) Transcranial magnetic stimulation (TMS) to elicit MEP from the paretic abductor pollicis brevis (APB) muscle. The recorded MEP parameters included threshold to TMS, MEP amplitude (expressed as ratio to M amplitude) and central motor conduction time.

Results: There was no significant difference between groups regarding age, sex, duration of stroke, side affected or the pre-intervention FM-UE scores or pre-intervention MEP parameters. There was a significant increase in FM-UE scores in both groups. However, there was a significant improvement in all MEP parameters only in the BATRAC group.

Conclusions: Both BATRAC and CI reduced motor impairment; but only BATRAC improved the MEP parameters of the paretic APB. Therefore, these findings might recommend the use of BATRAC in chronic stroke patients to improve not only motor performance, but also the central excitability. The latter might increase the duration of functional improvement.

Rehabilitation strategies in osteoporosis

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There are three stages; prevention throughout life (primary), osteoporosis treatment (secondary) and rehabilitation of osteoporotic fractures (tertiary) in osteoporosis rehabilitation. A detailed evaluation of physical, functional status and concomitant diseases/medication as well as lifestyle and life quality is essential. Osteoporotic 10-year major fracture risk and hip fracture risk is assessed according to FRAX tool since 2008.

A lifestyle including balanced diet, adequate intake of calcium and Vitamin D, physical activity and exercise, starting in childhood, increases peak bone mass and reduces loss in later years. In elderly people medical therapy of osteoporosis and reduction of falling risk is strongly emphasized. Prevention of second fracture is strongly recommended by the WHO in the last years.

Management Strategies in Osteoporosis

Adequate calcium (1000 mg/day) and vitamin D (800 IU/day) is recommended.

Initiate therapy in patients with previous fracture, a 10-year major fracture risk over 20% or hip fracture risk over 3%.

Calcium and vitamin D have been shown in RCT's to preserve bone mass and lower hip and other non-vertebral fracture rates in elderly patients. Supplementation with calcium, Vitamin D and protein (1 gm/kg/day) can favorably affect the recovery following hip fracture. Thus adequate intakes of calcium, vitamin D and protein are also an important component in the rehabilitation of patients with fractures.

General Management of Mobility and Falls

Risk factors associated with falls: 1. Impaired mobility, disability 2. Impaired gait&balance 3. Neuromuscular or musculoskeletal disorders 4. Age 5. Impaired vision 6. Neurological, heart disorders 7. History of falls 8. Medication 9. Cognitive impairment

Components reducing falls risk: 1. Avoidance of immobility 2. Weight bearing exercises 3. Physiotherapy for rehabilitation 4. Increase muscle strength 5. Reduce medication that alters alertness and balance 6. Improve home environment 7. Hip protectors

Exercise Programs for Osteoporosis Rehabilitation

Aims: Decreased risk of falling, improved bone mass and strength, muscle strength, balance, posture, and ROM, flexibility, cardiovascular fitness, well-being and quality of life. Evidence regarding fracture efficacy is lacking. Exercise program has to be patient-specific and safe, 3 levels of difficulty for starting and progression (duration, intensity and frequency). Weight-bearing, walking, aerobics, spinal strengthening, coordination, balance, thai chi, yoga, posture training exercises, have been reported on in clinical trials.

Rehabilitation Program Following Osteoporotic Fractures

Hip: It is aimed to regain as much mobility and independence as possible following hip fracture. Rehabilitation can improve transfers, gait, leg strength, flexibility and balance. A total body exercise program and progressive strengthening of hip muscles is beneficial. Patients progress from walkers to canes, then unaided walking. Hip strengthening exercises should be stressed periodically. Reduction of risk of falling, home safety assessment and balance training are other important issues.

Vertebra: A basic approach to acute vertebral fracture includes 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. Physical therapy interventions for pain control.

Back supports after vertebral fractures are used as temporary adjunct for restricting spinal motion and promote earlier return to activity. Multiple spinal fractures are indications for 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.

Spinal paravertebral extensor, core muscle strength, balance and posture have to be improved. Kyphotic posture should be corrected by a Posture Training Support. Education on safe movement and good body mechanics is valuable to minimize loads on the vertebral bodies and reduce risk of further fractures.

Forearm: During the cast or bracing stage, arm elevation, early mobilization and anti-edema control measures should be applied. Rehabilitation usually takes 12 weeks. Isometric contractions of the forearm muscle groups are performed while the arm is immobilized. Active and passive ROM exercises to all joints of the extremity, especially shoulder and elbow. Gradually perform pronation and supination with forearm fully supported; start progressive resistive exercises and grip strengthening measures like ball-squeezing.

Spinal Orthoses or Braces

Orthoses are designed to support or hold parts of the spine in correct alignment.

Corsets: Lumbosacral, thoracolumbosacral corsets and braces can be used.

PTS: Posture Training Support is a device with shoulder straps and a pouch which holds small weights in the back.

Vertebroplasty – Kyphoplasty: Several RCT's had reported a short-term advantage of vertebroplasty over medical treatment for pain relief in vertebral fractures, but these findings have been questioned by recent RCT's.

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New concepts in the fracture risk assessment: The role of a physiatrist

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Fragility fracture prevention has been traditionally associated with the diagnosis and treatment of osteoporosis, although more recently there has been a call to in addition evaluate risk factors for falls. Falling has been revealed to be the main risk factor for fractures and other injuries in the older adults. Approximately 30% of community-dwelling individuals and 50% of residential-dwelling adults older than 65 years fall every year, with half experiencing more than 1 fall. Five percent of these falls result in fracture and that percentage doubles for those older than 75 years. Falls and fall-related injuries or even a fear of falling has been shown to result in social withdrawal, loss of independence and confidence, admission to long-term care facilities, and significant depression and anxiety.

In addition to treating patients with osteoporosis, physiatrists typically screen for fall risk in certain populations and engage in evidence-based interventions that help decrease falls. By extending this practice to a wider group of patients who may be at risk for fracture, physiatrists have a tremendous opportunity to identify individuals at risk and customize interventions aimed at preventing both falls and fractures.

Because the traditional approach of prescribing medications on the basis of T-score alone does not fully evaluate fracture risk, the WHO Fracture Risk Assessment (FRAX), a free online tool, has come into use. It includes multiple clinical risk factors either alone or in combination with a BMD test to calculate the probability (absolute risk) of fracture over the next 10 years. Absolute fracture risk rather than relative fracture risk (T-score) better identifies patients for whom treatment is most cost-effective. The National Osteoporosis Foundation recommends that patients should receive medication if their 10-year probability of sustaining a hip or other major osteoporotic fracture equals or exceeds 3% and 20%, respectively.

Prevention of falls and fractures is a critical health care initiative, particularly as the percentage of aged population increases. While the role of physiatrists in fall screening is well-established, they may not take fracture risk into account, other than considering a (often secondary) diagnosis of osteoporosis based on a T-score. There are limitations to this broad label and diagnostic approach, as was previously explained. The FRAX includes the multifactorial risks of fracture beyond bone density, yet does not consider fall risk. A clinical decision-making algorithm that would inform and enhance the physiatrist's ability to screen, examine, treat, and refer postmenopausal women. All ambulatory, postmenopausal women older than 50 years, who attend physical therapy, should be screened for fracture and fall risk. Such screening is consistent with the role of the physical therapist in prevention and health and wellness promotion. The Fracture Prevention Screening Algorithm can guide physiatrists in determining whether each woman would benefit from exercise and education to promote bone health, versus those who would also benefit from a customized physical therapy program to reduce fall risk.

This evidence-based screening algorithm incorporates the FRAX to determine a patient's absolute fracture risk and the Functional Gait Assessment to screen for fall risk. Using these tools together should help identify patients who are at greatest risk for fracture. This will inform the development of targeted preventive interventions. Such interventions may consist of education about bone health and exercise that maintains bone density in the postmenopausal woman who is at low risk for falls or customized balance and strengthening exercise programs for the postmenopausal woman who is at high risk for falls. In addition, it helps identify when a medical referral is warranted.

Rehabilitation of the patients with congenital muscular torticollis

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Congenital muscular torticollis (CMT) is a condition in which the sternocleidomastoid muscle is shortened on the involved side, leading to ipsilateral tilt and contralateral rotation of the face and chin. It is the third most common congenital disorder of the musculoskeletal system in neonates and infants with an overall incidence as 1 in 250 live births. Frequency of the condition is reported to range from 0.3 to 2.0%. Facial asymmetry and deformational plagiocephaly are important problems in CMT.

In general, fetal malposition and birth trauma have been claimed to be responsible for the development of CMT. A history of difficult birth has been noted in 30-60% of the patients with congenital torticollis. Additionally, venous compression of the neck at birth may contribute to congestion and a subsequent compartment-type syndrome. However, CMT might be seen in the infants who were delivered by cesarean section.

Three types of CMT is described in the literature; sternocleidomastoid tumor (fibromatosis colli), muscular torticollis and postural torticollis (POST). Clinical findings and the prognosis are different in each these types. Complete medical history and detailed physical examination should be performed on the infants with CMT. Neurological examination including visual field tracking and response to sound has to be performed to rule out the other causes of torticollis. Ultrasound is the frequently used radiological technique in the evaluation of CMT. Fibromatosis colli affects the muscle size and echogenicity in which CMT muscles tend to be more hyperechogenic. Magnetic resonance imaging is not recommended as a screening tool in infants with CMT. It is recommended in the differential diagnosis of CMT and the torticollis patients who need the surgical approach.

Nearly, 50-70% of sternocleidomastoid tumors resolve in the first year with minimal deficits. But, among those whose pathology does not resolve, 60-70% develops cranial or facial asymmetry. Early physical therapy is essential in order to avoid the limited range of motion. Different therapeutic protocols are used depending on the practitioner. Active and passive stretching of sternocleidomastoid muscle is effective in more than 80% of the patients. Early and effective stretching therapy prevents patients from surgery. An example of stretching program consists of three sets of 15 stretches, holding the stretch 1s, with 10s rest in between, performed three times per week. Active positioning and home activities done by parents were also advised. Besides, bracing and botulinum toxin injections are the other treatment options, when necessary. Surgical procedures ranging from open myotomy to radical resection of sternocleidomastoid muscle are used in cases resistant to conservative therapy or patients present after the first year of life. Scar mobilization techniques and intensive neck range of motion exercises have to be performed up to four months postoperatively.

It has been stressed that, infants with CMT who were diagnosed earlier and had an earlier intervention had a shorter duration of rehabilitation. Initial cervical range of motion is an important prognostic factor for predicting the rehabilitation outcome of patients with CMT.

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Principles of cancer rehabilitation

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Cancer is the second-leading cause of death and becomes increasingly common with advanced age. The benefits cancer research are enormous and survival rates are increased for many cancer types but there are still many challenges for cancer survivors. These individuals need to maintain functional independence and receive adequate symptom control when it is appropriate. Over the past two decades, cancer rehabilitation has received little attention but with the extended survivorship due to early detection and enhanced multimodal therapies attention is being increasingly directed to quality-of-life domains of these patients.

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. The ultimate goal is to improve multiple dimensions of life satisfaction. The options rehabilitation services include inpatient rehabilitation, outpatient rehabilitation, consultation services during acute care or recurrence, home-health therapy services or extended care facilities.

The importance of rehabilitation needs in patients with cancer diagnosis has recently received increasing recognition. The need for cancer rehabilitation was documented in many studies. It was concluded in almost all studies that assessment of oncology patients be enhanced by consultations with rehabilitation physicians but there was an obvious underuse of such services. The reasons for underuse of rehabilitation services were reported as failure to identify functional impairments by acute care staff, lack of appropriate rehabilitation referrals, lack of existence and awareness of rehabilitation services and lack of knowledge among family members.

Cancer patients might have several problems that rehabilitation approaches are needed. These include fatigue, weakness, deconditioning, cancer-related 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, bowel and bladder dysfunction, sexual, dysfunction complications of disuse and bed rest.

Rehabilitation needs in specific tumor types might be different but the principles of programs are common. 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 activities of daily living. Rehabilitation goals can be defined according to the different stages of cancer. In preventive rehabilitation therapy the goals are to achieve maximal function in patients considered as cured or in remission. Supportive and restorative rehabilitation therapy are for patients whose cancer is progressing and the goals include providing adaptive self-care equipment, range of motion exercises, mobility techniques and all other preventive measures for the consequences of immobility. The goals of palliative rehabilitation therapy are to improve or maintain comfort during the terminal stages of the disease. The rehabilitation goals are usually defined according to factors such as reduced life expectancy, extensive comorbidity, degree of pain interference, dynamic lesions, and potential of rapid progression of cancer. In addition to these factors, desire of the patient for rehabilitation, and level of financial and domestic resources are important.

It is clear that rehabilitation approaches are needed but usually not provided for cancer survivors. This speech will discuss the key factors and conventional approaches and the new emerging evidence-based studies in the rehabilitation of individuals with cancer.

Amyotrophic lateral sclerosis disease-modifying therapy and assistive technology: Review and update

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Objective: To present an update on disease-modifying therapy (DMT) and assistive technology (AT) for persons with amyotrophic lateral sclerosis (ALS), at different stages.

Material and methods: A literature search using multiple literature databases (CINHAL, Cochrane Library, Current Contents, EMBASE, MEDLINE, PEDro, PsycINFO, OT seeker) was conducted. The search was limited to articles, including items in electronic format, chapters of books, and webpage of ALS organizations available in English, from January 1995 to May 2013.

Results: ALS is a motor neuron disorder that may encompass upper and lower motor neuron syndromes, either with a familial presentation or as sporadic cases. The incidence is 1/1000, and the prevalence is 5-7/100.000. Age of onset is 47-56 years in familial cases and 58-63 years in sporadic cases. Male:female ratio is 1.6. Current DMT include glutamate blocking agents, cell-based-therapies and growth factors with reported potential benefits, including prolong survival, slow disease progression in animal models, and safety for persons with ALS (PwALS). AT aims at accommodating disability and eliminating environmental barriers. For this presentation, the discussion regarding AT will be limited to those used for compensating limitations in mobility and communication in PwALS.

Conclusions: There are some promising results regarding DMT. AT is useful according to stage of the disease and disability level. Access to and usefulness of AT depends on impairment and socio-cultural factors.

Key words: Amyotrophic lateral sclerosis, disease modifying therapy, assistive technology

Rehabilitation management of the multiple sclerosis patient from a physiatrist's perspective

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Multiple sclerosis (MS) is one of the most common causes of neurological disability in the adulthood. MS patients have high prevalence of disabilities in personal as well as social domains due to early disease onset, progressive course and long duration. Symptoms and deficits in patients with MS result in functional impairments and handicaps. The most common symptoms are visual impairments, paresis, sensory disturbances, balance problems. Bladder and bowel disturbances, cognitive dysfunctions limit daily activities of the patients. These deficits can be classified as impairments (paresis, balance and coordination deficits, spasticity, cognitive dysfunction, bowel and bladder dysfunction), activity limitation (daily activities such as self care) and participation (social roles, employment) according to WHO ICF.

Fatigue is one of the most common symptoms in MS. It has impacts on daily living activities, ability to work, and social life. Treatment of fatigue should be optimized for the individual. Medications and their side effects should be reviewed as contributing factors. Fatigue management education, use of assistive devices for improving gait, and improving fitness by aerobic exercises are non-pharmacological approaches for fatigue management. Evidence for the efficacy and safety of the drugs used in MS related fatigue, is limited.

Gait disorders, balance problems: Fatigue, weakness, aerobic capacity, spasticity, sensory impairments, balance, visual problems and depression can affect MS patients' mobility. Exercise programs are helpful at preventing complications of inactivity, improving aerobic capacity and fatigue. Improving trunk control, balance, flexibility, strength and range of motion, normalizing skeletal muscle tonus are the main objectives of a gait training program. Proprioceptive and tactile stimulations and usage of assistive devices for the ambulation/mobilization should be considered according to patient's needs.

Spasticity can interfere with functional activities, especially mobility. Management of spasticity is important for prevention of contractures and pain. Positioning of the patient and education about spasticity related symptoms are the mainstays of the tonus management. Local or systemic medications have beneficial effects on spasticity if the target of the treatment is cautiously designed.

Pain is one of the most important and disabling symptoms of MS. Pain can be neuropathic due to primary lesion, central or peripheral nervous system dysfunction. It can be continuous or intermittent (i.e., trigeminal neuralgia, Lhermitte's sign). Pain can be secondary to spasticity, musculoskeletal dysfunction, gait and postural problems. Local reactions of the injectable medications and headache can be related to MS treatments.

Bone health in MS: Patients with MS have some potential risk factors for osteoporosis and fractures. These include corticosteroid treatments, vitamin D deficiency, immobility, balance problems, and weakness. Antiresorptive therapy with bisphosphonates and optimizing vitamin D levels, decreasing the risk factors for falls, improving balance and gait are the objectives of the optimizing bone health in the patients with MS

Cognitive and emotional problems: Attention, recent memory, information storing and processing, executive functions and visuospatial perception are common cognitive impairments in MS patients. Emotional disturbances, personality and behavioral changes, and depression affect patient's life and rehabilitation. These problems have adverse impact on daily living activities. Cognitive behavior therapies, cognitive rehabilitation programs may improve symptoms. Some medications are use for treating depression.

Bladder dysfunction has an unfavorable impact on mobility, daily living activities and on quality of life for the MS patients. Most of the patients have overactive detrusor; and detrusor-sphincter dyssinergia may also be present with the problem. Urodynamic studies are mandatory to assess the neurogenic bladder dysfunction. Upper and lower urinary tract dysfunction and infections should be evaluated, managed and treated. Because of autonomic dysfunction and abnormal rectal function, constipation and fecal incontinence are the main bowel problems in patients with MS. Patient education about diet and bowel programs, medical treatments can be effective in the solution of the problems. Sexual dysfunction rehabilitation includes education and counseling, pharmacotherapy.

Employment: Disabilities of the patient affect life, employment, social function and overall quality of life. Mobility problems, fatigue, cognitive deficits and incontinence are the main limiting factors for employment.

Rehabilitation is an ongoing process and it should be reviewed as such to foresee individual problems of the patient, to restore and optimize the MS patients' function, and to improve the quality of life.

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Exercise in cardiopulmonary rehabilitation: Current recommendations

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There is a general consensus that exercise training is the core component of cardiopulmonary rehabilitation. However, the type and features of exercise such as frequency, intensity, and duration depending on the type of cardiac or pulmonary conditions require consideration. In patients with coronary heart disease (CHD) or those with coronary artery bypass surgery, exercise-based cardiac rehabilitation involving moderate intensity aerobic exercise consisting of either continuous exercise or interval training with alternating 3 to 4 minutes of high intensity exercise and moderate intensity exercise sometimes combined with resistance training has been shown to reduce total and cardiovascular mortality in the long term as well as hospital admissions in the short term, although not total MI or revascularization (1,2). In patients with mild to moderate heart failure, aerobic exercise such as brisk walking has been found to improve exercise capacity with improvements in health related quality of life (HRQoL) and reductions in hospital admissions and without an increase in all-cause mortality (3). End-stage heart failure patients using ventricular assist devices as a bridge to heart transplantation may also benefit from low level physical activity/exercise with an intensity of no greater than 13 in Borg scale and with a specific caution on some symptoms and signs (4). Moderate intensity aerobic activity in the form of walking and cycling is recommended for patients with atrial fibrillation with beneficial effects in exercise capacity, activities of daily living, and HRQoL (5). Two to three sessions of usually low to medium intensity aerobic training are associated with improvements in exercise capacity and QoL in patients with chronic obstructive pulmonary disease (6). Aerobic exercise training and/or resistance training of moderate intensity are also recommended for patients with heart or lung transplantation to improve exercise capacity and muscle strength (7,8). In conclusion, the favorable effects of exercise training are well established particularly in CHD. There is also evidence for the benefits of exercise training in other cardiac or pulmonary conditions. It is important that caution should be taken when prescribing exercise. The sine qua non of exercise for cardiopulmonary patients is that exercise should be tailored to the individual with a cardiopulmonary disease and it should be monitored, monitoring ranging from self monitoring to ECG monitoring.

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Pulmonary rehabilitation in spinal cord injured patients: Headings and subheadings

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The purpose of this lecture is going to review pulmonary dysfunction as a complication of spinal cord injury. Not only it is a proverbial complication, it is also a serious autonomic dysfunction. As it is known, it is important to understand the impact of spinal cord injury on every autonomic function. Respiratory autonomic dysfunction has newly embodied in the literature of autonomic dysfunctions because of the complex pattern of innervation of the respiratory system. In this complex pattern of innervation, both somatic and autonomic nervous systems are enrolled in the rhythm of the system. As a devastating condition, spinal cord injury makes gross and irreversible changes in the somatic and autonomic nervous system as well as the respiratory system itself. To understand the why and how of respiratory autonomic dysfunction are the first steps of remedying pulmonary dysfunction in these patients.

Core Journals in physical & rehabilitation medicine: An update on the European point of view

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What makes a journal a leader in its specific field is determined by many factors. In 2008, the ESPRM (European Society of Physical and Rehabilitation Medicine) Consensus Committee on “International Rehabilitation Journals” examined and classified the international Physical and Rehabilitation Medicine (PRM) journals from a European perspective. The reason for this initiative – agreed upon by the members of ESPRM and the delegates of UEMS PRM Section and Board – was mainly to identify which journals from a European point of view should be considered (by European PRM specialists) as first choice for publishing and reading research in the field of PRM. The recommendations made – of potential use to authors, readers, editors, publishers and institutions – may also have, as a side effect, countered the “hegemony” of commercial enterprises which own the most important biomedical databases (and often have strong interests in Anglo-Saxon countries) in classifying PRM scholarly journals and assessing their quality, simply through a few bibliometric indicators.

Considering the evolving world of PRM literature and to improve our ability to search and do science, an update of those recommendation was warranted after five years. Thus, a new journal selection process was recently carried out based on expert opinions corroborated by both a series of bibliometric indices, and evaluations including: 1) indexing of the 3 main international databases in the biomedical field (in our specific categories): the Thomson Reuters Journal Citation Reports (JCR); PubMed; and EMBASE; 2) the aims, scope and contents of each journal; 3) the membership of the editorial board; 4) the availability and ease of access to online content; 5) the patterns of cross-citations among journals; 6) the circulation and appreciation of each journal in European countries.

The results of this new selection process confirm the five top journals selected in 2008 (the American Journal of Physical Medicine and Rehabilitation, the Archives of Physical Medicine and Rehabilitation, Clinical Rehabilitation, Disability and Rehabilitation, Journal of Rehabilitation Medicine) and add two new journals: the European Journal of Physical and Rehabilitation Medicine, and the International Journal of Rehabilitation Research (official journal of the European Forum for Research in Rehabilitation).

We acknowledge that in the process of publication, authors should always identify the most appropriate outlet for their work in terms of both journal characteristics (e.g., infrastructure, readership, prestige and performance) and personal aims regarding research and publication (that can change during the career life cycle). With the recent initiative (Franchignoni et al. 2013), the European PRM bodies are indicating their point of view, giving an influential update on the changing and growing world of scholarly publishing in PRM.

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Biopsychosocial assesment and promotion of functioning within ICF terminology

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Admission to ICU usually is associated with big, if not dramatic change(s) in client's life, whether an admission is for sudden disease/injury or for changes in previously prevailing health condition. Unfortunately, the stay in ICU does not deteriorate the physical functions and activities only but the holistic wellbeing of the client, i.e., the whole 'after ICU quality of life'. Therefore, discharge from ICU should always activate the construction of client's current functional profile by assessing client's functioning and disabilities from all three perspectives of human existence, i.e., physical, psychological and social.

Which of the social and health care organizations and social-political systems are responsible 1) for production of the client's functional profile and 2) for construction of the rehabilitation/functional promotion plan based on the functional profile in question and 3) for case management to carry out the rehabilitation/functional promotion plan in client's living surrounding, depends of national law and local social political regulations. – In Finland, big revisions in dividing responsibilities to provide various types of services in different fields of social and health care system are currently going on. Notwithstanding the site of organizations responsible for service delivery ICU clients need their comprehensive, multiprofessional (i.e. biopsychosocial) functional profile to be determined in order to be possible for them to continue their human rights based life .

Today, in 2013 we are lucky to have WHO's International Classification of Functioning, Disabilities and Health (ICF) to describe human functioning along universally understood language. ICF very well fulfills the demands of being internationally accepted descriptor of functioning and disabilities at the conceptual level. It also offers some useful guidelines for quantification of its functional concepts and many types of measurement strategies or techniques have been developed, such as 'Linking', 'Checklists' and 'Core-sets' to progress the collection of functional measurement data. However, all the measurement strategies developed so far suffer from a common failure of not being 'client centered' or able to cover the comprehensive ICF content with its 1424 categories. It can be stated that no shortened category list is according to the human rights based functional assessment because outsiders can never know which of the 1424 categories are the most meaningful ones in relation to a person's life. For instance, core-sets, as valuable as they are to start the functional assessment process, do not take into account that 'Mary is not the low back pain patient only'- she is a person living her own daily life.

A multiprofesional team in Finland (Talo, Rytökoski Hämäläinen 1982 -2013) created the so called 'BPS-ICF model' to develop the systematic, standard strategies to assess person's biopsychosocial functional resources and disabilities to be the base for construction of cure/care/rehabilitation plan. This multiprofessionally determined functional promotion (rehabilitation) plan should always be given as a tool for case management experts to start their work tasks of controlling the enforcement of the plan in client's living surrounding. The BPS-ICF model is called 'client-centered strategy for functional assessment' because it lets the client him/herself to select the categories experienced as meaningful resources or disabilities in his/her own life. For construction of the BPS-ICF functional profile all types of techniques can be used to collect functional measurement data: checklists, core-sets and all kinds of existing functional measurement instruments and interviews linked to ICF. In addition to that BPS-ICF model includes simple scales for ICF second-level categories to be used 'client-centeredly' to collect both self-assessments and expert assessments about individual functional level.

The role of rehabilitation in intensive care unit acquired weakness

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In the last decades with a reduction of mortality in intensive care units, some neuromuscular abnormalities have been observed in the survivors. These abnormalities might have a serious negative effect on the physical function and quality of life of the patients and sometimes may be severe and permanent. The condition is characterized by profound weakness that is greater than that might be expected to result from prolonged bed rest. The abnormalities are referred as critical illness myopathy (CIM), critical illness polyneuropathy (CIP) or critical illness polyneuromyopathy (CINM) or as an umbrella term Intensive care unit acquired weakness terminology is used.

Etiology and Pathophysiology: Immobility causes a reduction in muscle protein synthesis and muscle metabolism which leads to a decrease in muscle mass especially in the lower extremities. This is much more pronounced in critically ill patients having multiorgan failure and ventilator dependent. Sarcopenia in elderly patients may be another factor. Microcirculation is altered throughout the body, there is insulin resistance, increase in proinflammatory cytokines and reactive oxygen which is associated with an increase in muscle proteolysis and a net loss in muscle proteins. Risk factors include: hyperglycemia, systemic corticosteroids and long lasting neuromuscular blockade.

Physical examination: In CIP, there is muscle weakness together with reduction in DTR, loss of pain and vibration. Cranial nerves are not affected but there may be facial weakness. In CIM weakness is more pronounced proximally and pain sensation is preserved. Some patients may carry both forms. Although EMG is an invasive method it might be used to confirm the diagnosis and exclude other conditions and in some cases muscle biopsies may be required. Clinically three muscle groups in each extremity (shoulder abduction, elbow flexion, wrist extension, hip flexion, knee extension, ankle dorsiflexion) are scored for Medical Research Council, those lower than 48 out of 60 are diagnosed as weakness. Typically symmetrical weakness can vary from mild paresis to significant quadriplegia. Sedative agents may mask symptoms or delay identification of ICU acquired weakness by clinicians. Sensory examination is usually not optimal in uncooperative patients and / or due to peripheral edema.

Physical therapy should be started as soon as the patient is stabilized enough to overcome the increased vascular and oxygen demand with the interventions. Since the medical condition of intensive care patients' changes continuously during the day they should be examined carefully for the cardiovascular and respiratory measures during rehabilitative interventions. It should be kept in mind that even passive range of motion exercises or sitting increase oxygen consumption but early interventions are the best strategy to overcome the weakness and when appropriate guidelines are followed they are safe.

In addition to the early general mobilization approaches, neuromuscular electrical stimulation and bed ergometers are used with promising positive results.

Excitability of the anterior horn cells

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Effect of Volitional Muscle Relaxation on H reflex

To test the effect of volitional inactivity and subsequent voluntary muscle contraction on the excitability of the anterior horn cells in the lower limb, we studied the time course of H reflex recorded from the soleus muscle in 11 healthy subjects after resting the muscle for one and two hours. (1) The H-reflex amplitude declined ($p<0.05$) after rest, remained the same after standardized exercise, and recovered after standing. Statistical analyses showed a significant difference in the degree of suppression induced by one- and two-hour periods of rest. We conclude that the excitability of the spinal motor neurons tested by H reflex undergoes a substantial diminution after a relatively brief cessation of volitional motor drive, recovering quickly upon resumption of normal muscle activity.

Suppression of F Wave vs MEP after Resting the Muscle

Additionally, the F wave may also provide a means to clarify the role of central drive on the excitability of the anterior horn cells. We studied the effect of sustained rest lasting from 1 to 12 hours on the F wave and transcranial motor evoked potentials (MEP). (2) F wave and MEP recorded from the abductor pollicis brevis in 10 and 6 healthy subjects showed a progressive suppression after volitional muscle relaxation and a quick recovery upon a brief, standardized voluntary muscle contraction. These findings indicate 1) MEP amplitude commonly used as a measure of cortical excitability reflects, at least in part, a reversible change at the level of the anterior horn cell and 2) the absence of F wave, usually taken as a sign of conduction block of the peripheral motor axons, may also result from inexcitability of spinal motor neurons after volitional immobilization.

Selectivity of Rest-Induced Hypoexcitability

To determine whether this physiologic suppression occurs as a general effect of relaxation or as a selective change involving only the immobilized muscle (3), we recorded F waves simultaneously from the first dorsal interossei (FDI) and the abductor digiti minimi (ADM) in 10 healthy subjects before and after volitionally inactivating one muscle (target) for 1, 3 and 6 hours while periodically contracting the other muscle (control). In the target as compared to the control muscle, F waves showed a progressive decrease ($p<0.05$) in persistence and amplitude after muscle relaxation, followed by a quick recovery upon brief muscle contraction ($p<0.05$). These findings suggest that volitional muscle relaxation for 1-6 hrs suppresses the F waves of the immobilized muscle through selective disfacilitation or inhibition of the corresponding anterior horn cells, without equally affecting non-immobilized muscles innervated by the same nerve.

Motor Imagery to Counter Rest-Induced Suppression

To further evaluate the role of central drive, we studied the effect of volitional muscle immobilization on the excitability of the anterior horn cells and its modulation by mental simulation of movement in 10 healthy subjects. (4) In experiment (1), we recorded 100 F waves from abductor pollicis brevis after stimulation of the median nerve at the wrist for three consecutive sessions: baseline at the beginning, after volitional relaxation of the muscle for 3 hours, and following a standardized exercise of thumb abduction (Fig.1 top). In experiment (2), we repeated the same sequence but instructed the subject to periodically simulate muscle contraction without actual movement during the 3-hour relaxation period. Both F-wave persistence and amplitude declined ($P<0.05$) after volitional muscle inactivity in experiment (1) but not in experiment (2). Thus, motor imagery without muscle contraction during the rest period effectively counters the suppression, eliminating the anticipated changes. We conclude motor imagery without overt motor output suffices to maintain subliminal excitability of the spinal motor neurons.

Summary

H-reflex amplitude shows a significant reduction after voluntary immobilization of calf muscles for 1-2 hours and a quick recovery following muscle contraction. Similarly, sustained volitional muscle relaxation for 1 to 12 hours causes a muscle specific reduction of F-wave persistence in proportion to the rest period. Mental simulation of movement without actual muscle contraction suffices to block the effect of volitional relaxation. A reversible change at the level of the anterior horn cells can alter the MEP amplitude, commonly used as a measure of cortical excitability. Additionally, reduced amplitude of H reflex and the absence or low persistence of F wave, ordinarily taken as a sign of conduction block, may result from reduced excitability of the spinal motor neurons rather than a peripheral nerve involvement.

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Robotics in rehabilitation: A new opportunity for supporting the elderly

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Objective: A growing number of old live-alone people require the development of assistive technologies to help them to live longer and safer in their own home. Application of robots has the potential for this purpose. Rehabilitation robots can provide treatment support in case of neurological and musculoskeletal diseases, but they can also help in everyday life with cognitive stimulation, memory support, emergency signal, physical aid etc. Several projects focus on this purpose. Among other initiatives, the DOMEQ-project of the Ambient Assisted Living Joint Programme of the European Union aimed to develop a companion robot that gives cognitive help to the elderly. Users can communicate with the robot by voice commands or by using the touch screen and the simplified graphic user interface of the robot. The objective of this study was to test the robot-functions in real milieu, in old people's home.

Materials-Methods: Eight subjects over 70 years, living alone, were involved in the trial. Robots were deployed at users' homes for circa a three-month-long period. The two robots were at users' homes for two years altogether. Evaluation was based on the usage logs and on the subjective opinion of participants.

Results: The acceptance of the robot was quite good among the elderly, interestingly even better among those who have no experience with computers before. The classic computer functions (Internet, Skype, entertainment) worked most reliably. The most problem occurred in connection with self-localisation and the speech recognition system. The robot proved to be safe during the whole trial.

Conclusions: An assistive robot can be a valuable companion for old people living alone. Certain functions of the tested robot should be improved (navigation, speech recognition) and importantly the real robotic functions should be extended. Providing physical aid would increase the usefulness of the robot. Such robots could be used not only individually, but also by home-care services with an operation centre in the background.

Key Words: Robotics, assistive technology, aging

How to read and interpret an article in physical and rehabilitation medicine?

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Evidence-based practice, the gold standard for treatment, is very important in physical and rehabilitation medicine (PRM) to ensure the provision of the best care for our patients throughout the continuum of care. The proper use and implementation of the evidence in PRM practice depends on the proper reading and interpretation that is critical appraisal, of the articles published. Since systematic reviews (SRs) and/or meta-analyses (MAs) of randomized controlled trials (RCTs) are the cornerstone of evidence-based practice providing the most reliable evidence on the effectiveness of PRM interventions, PRM specialists should be encouraged in translation of knowledge/evidence available in SRs and/or MAs into clinical practice. To select the best evidence in SRs for guiding treatment decisions, a critical appraisal involving interpreting information in a systematic and objective way is necessary which can be done rapidly by asking three important questions: the nature of the results such as the effect size, their validity, and their applicability to the patients in question. The National Center for the Dissemination of Disability Research provided a comprehensive guideline for assessing SRs and/or MAs with detailed questions additionally including those on protocol, database searching, and assessment of the methodological quality (1). To assess the methodological quality of RCT based SRs evaluating treatment, the Assessment of Multiple Systematic Reviews (AMSTAR) is a validated and commonly used measurement scale (2). A recently developed questionnaire, the review paper assessment tool, was shown to differentiate between rehabilitation reviews with low and high risk of bias (3). As for individual RCTs in PRM, there are a number of methods to assess the methodological quality; the Jadad scale and the Delphi list were indicated to have good validity (4). There are also questionnaires for critical appraisal of other types of trials such as case control studies, cohort studies, qualitative research, and economic evaluations (5). Translation of best evidence from research into clinical practice in PRM along with consideration of the needs and values of the patients will promote the care of patients as well as the medical specialty of PRM.

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How to write methods section in research studies?

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The Methods (or Material & Methods) section of a research study is the most important aspect of a research paper as it provides the information by which the study's validity is judged. Therefore the authors should give a clear and precise description of how the study was performed and the rationale for why those procedures were chosen. The methods section should document what was done to answer the research question and how this was done, by justifying the study design as well as explaining how the results were analysed. The methodology should be written with sufficient information such that the study could be reproduced by other investigators using the procedures outlined.

Reporting the methods section in research studies usually includes the following sequence: Research design, subjects, ethical considerations, procedures/ interventions, instrumentation/measurements and statistical analysis. Subjects section should include the details about sampling as well as the inclusion and exclusion criteria of the subjects. Study procedures should be explained including interventions if applicable. Instruments or measurements used in data collection should be described. Finally statistical methods used should be specified. This reporting style might show slight differences depending on the research design, whether the study is observational or experimental or methodological. This presentation will review the principles of reporting methodology in research papers and will demonstrate the checklists for different research designs.

Key Words: Research, methods, research study

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Family therapy in rehabilitation

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Physical challenge or disability does not only create challenge to the person but it can impact the couple's relationship, family members and the family environment. When a child is born with special needs, there are many new challenges for the entire family. As the child grows with each developmental stage from infancy to young adult years, the child's special needs influence the lives of everyone in the family. Roles and routines may change, and siblings, parents, grandparents and other extended family members may be affected. Similar impact happens when suddenly someone in the family becomes injured or diagnosed with an illness creating a disability. Parents of a child with disabilities are under increased stress when compared to parents of typically developing children. However, Family Therapy helps family members better understand and communicate with each other to resolve differences, conflicts and problems. Family therapy acknowledges that everyone in the family is impacted when a crises or problem arises. Also the family functioning has an impact on each individual and on the treatment outcome of the person with the physical challenge or disability. One benefit of family therapy is that instead of focusing on the disability or making the disability the problem it helps the family by improving communication, identifying strengths, resolving family conflicts, strengthening the bonds and developing coping mechanisms.

The goal is to create a healthy, happy, functioning family regardless of the severity of the disability. It is not the disability in the family that causes despair, depression, fear, or conflict handicapping the family but rather how people react to the disability and to each other. It is how they cope and how the family manages itself determines whether this is a problem or not.

Families report family therapy helps everyone in the family to be heard and seen. It takes the focus away from the disability but addresses the impact on the family and the relationships and the needs of each individual in the family. It helps to strengthen the couple's relationship which is often put aside, strengthens the sibling relationship. In family therapy the focus is on strengths, resources of the individuals and the family. It helps family to realize the resources within and among themselves. It empowers the family realizing their strengths, increases their problem solving ability enabling them to be self-reliant and to outreach and advocate for the special needs of the family member with the physical challenge or disability

The presenter will talk on how family therapy can be beneficial to enhance treatment outcome in rehabilitation. Also, she will present on a project she had collaborated with Istanbul University Hospital Pediatric Rehabilitation Unit's Family Focused Treatment Project. She developed a 6 week program for parents using the Satir Transformational Systemic Therapy (STST). The aim was to help parents gain better understanding of themselves, the family dynamics, strengthen the parental dyad by strengthening the couple relationship and creating a community of support so that the group could continue being a support community after the program was over.

The program impacted a group of parents of children with cerebral palsy to become empowered and to form a community ending isolation . Parents learned to move away from the "problem" to resources, within, between and among.

Ethical issues in rehabilitation research

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Objective: Collect personal experiences of problematic areas and study available references on ethical issues in rehabilitation research.

Method: Literature survey, critical review of findings.

Results: Authors name three to eleven ethical principles in rehabilitation of persons with disabilities. The following are of importance also from the point of research: autonomy, benevolence, confidentiality, equity, and respect. Additionally research ethics of some other populations may also serve as starting points, e.g. children, long term care residents, persons receiving end of life care. Selected ethical issues of special importance are listed below rather as examples presented along the research process. Choosing person and practice orientated research goals. Selection of homogeneous study populations as e.g. contextual factors may be different and critical definition of appropriate control groups if needed. Understanding of the persons' lived experiences while advancing through the rehabilitation process; utilizing benefits of participatory research. Within this process timing of obtaining the informed consent, regarding autonomy of the person as the key principle is important, or the selection of an appropriate proxy for giving consent. Another key point is getting the input of all needed team members adequately represented in both study planning and process. The list can be extended by the value of qualitative studies in rehabilitation research, as well as of selecting sufficiently long-time follow-up period. Understanding of causal relationships should be holistic, e.g. simultaneous appearance versus sequential order. Finally the need of avoiding publication bias by publishing unexpected or negative outcomes, and the need of feeding-back outcomes to study participants are emphasised.

Conclusions: Research in rehabilitation may provide different, but equally reliable evidences as medical studies. Due to a set of factors ethical considerations have specificities that should be understood and accepted by researchers.

Key words: Ethical issues, research in rehabilitation, system thinking, autonomy, participatory research, qualitative studies

The chronic pain performance curve: A new model for our times

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Chronic pain management is challenging due to the subjective nature of pain mixed with or without a substantial nociceptive component. Often patients become passive and hopeless due to their condition. Any treatment plan must be coordinated to address the objective nociceptive elements and the subjective elements of chronic pain. I propose an intuitive paradigm which is simple to understand, communicate to team members and to empower patients.

Physiatry is in essence, improving patient function by overcoming new impairments such as chronic pain and other barriers in an effort to reduce disability. Predicting disability after injury with chronic pain is often based on social and psychological factors. The definition of pain by the International Association for the Study of Pain (IASP) has four elements. Two of those elements are nociceptive in nature: an unpleasant sensory experience due to actual tissue damage. Two are more subjective: an emotional experience related to potential tissue damage. These are similar to emotional suffering and anxiety. I propose these are simply triggering of the sympathetic fight or flight response. The negative health consequences of physical and emotional stress followed by relentless cortisol production are well established.

This work extends the performance-arousal curve illustrations previously developed. Relentless triggering of cortisol will affect chronic pain patients in a manner consistent with those illustrations. The fundamental human emotion of the fight or flight response is fear. Learning how to address fear, uncouple the fight or flight response and develop better autonomic nervous system balance could improve performance. For the purposes of the paradigm, I also propose that the fundamental emotion of the parasympathetic nervous system is trust.

Heart Rate Variability (HRV) indices are well established predictors of fitness, age, anxiety, fetal distress, mortality after myocardial infarction, and distress on polygraph testing. Research continues to demonstrate various coaching methods can improve HRV coherence indices using a simple heart rate monitor and computer software. Improved emotional resilience is then seen. Recent technological advances now make it possible to prescribe home practice strategies with simple low cost equipment. The objective data is easily monitored and can be studied using quantitative physiologic measures.

Over the past several years, this clinic has seen anecdotal success with this low cost, low risk paradigm. If patients are open-minded and understand the intuitive paradigm, they initially become more hopeful. The patients seem to experience increased empowerment, leading to healthier decision making and followed by healthier habits. I propose this chronic pain performance paradigm will lead to better chronic pain functional outcomes with reduced utilization of costly high risk medications and procedures as coping ability increases. We now have the physiologic outcome measures and the low resource tools to measure this hypothesis.

Activities in return to work on the international level

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One of the main values of rehabilitation measures is the employability of persons with disabilities. This kind of holistic approach has been highlighted by several international organizations like Rehabilitation International (RI, New York), International Social Security Association (ISSA, Geneva) and International Disability Management Standard Council (IDMSC, Canada). The framework of the ISSA Guidelines on Return to Work (RTW) being adopted by the General Assembly in November, 2013 will be presented in Istanbul. These guidelines should convince decision makers and payers, such as state authorities, insurances and employers, to invest in rehabilitation. Researchers in rehabilitation should use return to work and the international quality criteria as important indicators for measuring structure, process and outcome of services in rehabilitation. The UN-Convention of the Rights of Persons with disabilities (Art 27 UN-CRPD) is part of the international concept.

Virtual reality in the rehabilitation of phantom limb pain: What are we doing and how do we measure it in research and in daily practice

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What we “really” measure when we assess pain in our patients

Functional reorganisation in the somatosensory and motor cortex of adult brain has been convincingly demonstrated. These plastic changes have fundamental implication in the understanding of chronic pain and in the development of new rehabilitative strategies in patients with neurological diseases.

The cortical reorganisation in amputees was first postulated and further demonstrated by Ramachandran.

The application of MBT in controlling PLS relies on these demonstrations. It has been suggested that the mirror box and other rehabilitation strategies such as the more recent rehabilitation imagery may work in some patients by providing a means to link the visual and motor systems to help them recreate a coherent body image and update internal models of motor control . To obtain this it is required that the user attempts to ignore the intact limb providing the reflection, in order to focus on the image of the phantom limb.

Even though of great rehabilitation interest, until now there are only few papers on the clinical results of this treatment, reporting very limited number of treated cases. Also in the only extensive study present in literature where 80 lower limb amputees underwent mirror therapy with negative results, no side effects or withdrawal from therapy have been reported. However clear difficulties in the extensive application of mirror therapy to a non selected group of amputees exist. The side effects in the application of the MBT, strongly challenge the notion that its application can always help amputees to recreate a coherent body image and update internal models of motor control. In other term the presence of side effects forces the physiatrist to do a step back and to reconsider where we are and what we should consider and measure to go further in the rehabilitation of amputees.

This last point opens another pivotal and controversial point that will be tackled in another speech: what we measure when we assess pain in our patients.

Postoperative rehabilitation protocols for rotator cuff lesions

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Rotator cuff tear can manifest clinically in a variety of ways causing shoulder pain, dysfunction, weakness, alterations in glenohumeral kinematics, and shoulder instability. Symptomatic rotator cuff tears are thought to effect between 4%-32% of the population and are more prevalent with increasing age. Nonsurgical management is the preferred method of initial treatment. Patient age, activity level, and tear size influence surgical decision making .When nonsurgical management fails operative repair is necessary (1).

Successful outcome after surgical rotator cuff repair is dependent on the specific surgical intervention as well as appropriately planned and executed rehabilitation. Functional outcome of patients who have undergone rotator cuff repair is dependent on patients age, activity level, duration of symptoms, extend of the tear, location of the tear, number of tendons involved, rotator cuff tissue quality, muscle atrophy, associated shoulder pathology, presence of systemic diseases, smoking, surgical technique and rehabilitation related problems.

Natural history of rotator cuff injury appears to indicate that most small tears will enlarge if not surgically repaired (2). Healing of ruptured rotator cuff tendons only occurs when the tendon is repaired back to its footprint on the greater and lesser tuberosities of the humerus. Tendon healing after surgical repair is divided into three phases which include an inflammatory phase, a proliferative or repair phase, and a remodelling phase. (3). Understanding of timing of these phases is important to safely individualize the rehabilitation program. Remodelling repair tissue can not reach maximum tensile strength before 12-16 weeks post repair.

Primary goals of postsurgical rehabilitation are allowing healing of repaired rotator cuff tendon while minimizing stiffness and muscle atrophy. Many current rehabilitation protocols after rotator cuff repair are based on healing time lines. Patients with rotator cuff repair surgery do not progress in the rehabilitation at the same time. An evaluation based approach in rehabilitation takes into account not only the healing time lines but also attainment of specific clinical goals. Protective and accelerated rehabilitation protocols are used based on individual patient risk for developing postoperative stiffness. Protective protocols are applied after arthroscopic repair of rotator cuff tears greater than 5 cm or involving more than 2 tendons, poor tissue quality or repairs with greater tension (4). Immobilization of the shoulder in abduction position following surgery for 4-6 weeks is currently widely used because vascularization is improved and tension on the repaired tendon is minimized in this position. Rehabilitation protocols are frequently divided into 4 phases. Progressing from a maximum protection phase to minimum protection phase. The patient is advanced to next phase once he has achieved passive and active range of motion goals in addition meeting the healing time lines required for progression to next phase of rehabilitation. Finally shoulder rehabilitation should integrate the kinetic chain throughout the rehabilitation program. Rather than isolating the shoulder and gradually incorporating the rest of the body, rehabilitation program should focus on entire neuromuscular system by integrating multiple body segments (5).

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Highlights on 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.

To increase the success of total hip arthroplasty (THA), scientists are working to develop more resistant materials, prosthesis designs and new techniques. They are also trying to improve accordance of prosthesis and decrease body's inflammatory response

Total Hip Replacement: THA is the replacement of the femoral component and acetabular component of the hip joint with 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 with 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 aims of any rehabilitation program are maximize the patient's functional status and minimize postoperative complications. Right after surgery; the hip will need special care until it has completely healed. A special rehabilitation program will be made for fast healing. This program will help the patients get stronger and improve their range of motion. They will probably use a walking aids 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.

Ageing world and geriatric rehabilitation

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“Old age isn’t so bad when you consider the alternative”.

Maurice Chevalier, New York Times, 9 Oct, 1960

Global aging- Global aging is the result of health policies adopted throughout the world aimed at increasing life expectancy. Maintaining the health and quality of life in an aging population is often accompanied by significant social and economic difficulties. Hence the growing need to creating new policies and strategies aimed at increasing the level of welfare especially considering that; there is a very significant difference in terms of life expectancy at birth between developed and developing nations in the current century. Throughout the 21st century health professionals will increasingly be required to be familiar with old age care whatever the specialty they choose. Health care services should include; health promotion (primary care, immunization, case finding and screening, general practitioner services), community care (health visiting, domiciliary rehabilitation), social services (home help), hospital based services (acute medical care, psychiatric care, rehabilitation, outpatient clinics- palliative care), nursing home care and home care services.

Demands of the older persons- Demands of the older persons are somehow different from the demands of the younger ones: different disease pattern, more vulnerable to the environmental risk factors, chronic diseases (cardiovascular diseases, hypertension, stroke, musculo-skeletal diseases, falls, etc) are frequent, disability-free life expectancy changes, assessment of functional ability often includes an evaluation of the individual’s ability to carry out various activities of daily living and social issues related to biological problems. Another issue is; to navigate the health care system and actively participate in the clinical decision-making process, aging consumers must possess health literacy, an essential skill that enables them to locate, understand, and use health information.

Geriatric rehabilitation- Given the burgeoning number of older persons living longer, Rusk’s observation, as modified by Kottke, becomes ever more relevant: “As modern medicine adds years to life, rehabilitation becomes increasingly necessary to add life to these years”. Appropriate roles for geriatric rehabilitation: Intervening to reverse disability caused by specific disease or injury (e.g., stroke, hip fracture), contributing to preventive gerontology by virtue of promoting structured physical fitness (i.e., wellness) programs, early rehabilitation for common musculoskeletal disorders to avoid progression to disability. Contents of significant contributions of rehabilitation to care of older adults are; functional assessment (including evaluation of underlying impairments contributing to functional loss and dis-ability) with realistic goal setting, interdisciplinary team care, efficacious adjustment of therapy interventions (e.g., timing, set-ting, intensity) to prevent, reverse, or minimize disability.

General aspects of geriatric rehabilitation- Identify the correct diagnosis, assess for comorbidities, involve the patient and the family, team approach to care and prevent complications (A,B,C). A,B,C are: Aspiration, Anorexia, inactivity, Bedsores,Constipation, Contractures, Cognition, DVTs, Depression, DUs, Else: infections (UTI, Pneumonia), pain, incontinence. Frail elderly patients should be screened for rehabilitation potential. Standardized tools are recommended to aid diagnosis, assessment, and outcome measurement. The team approach to geriatric rehabilitation should be interdisciplinary and use a comprehensive geriatric assessment. Medication reviews and self-medication programs may be beneficial. Future research should address cost effectiveness, consensus on outcome measures, which components of geriatric rehabilitation are most effective, screening, and what outcomes are sustainable.

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Statistical issues in rehabilitation research

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The workshop will highlight some pressing issues in conducting and publishing research in the field of rehabilitation. The topics will include the proper (and improper, yet prevailing) interpretation of p-values, the reporting of variability (the false dilemma of choosing between standard deviations, standard errors and confidence intervals), the basics of meaningful data visualisation (and the most persistent errors and bad practices in this field), some popular data analysis strategies that should be avoided (such as unnecessary categorisation and misconceptions regarding rank-based methods), and widespread misuse and abuse of significance tests (the notions of data dredging, failure to adjust for multiple testing, and capitalisation on chance). General recommendations will be given and some personal views based on the author's wide experience in the roles of statistician, researcher, reviewer and editor will be discussed.

Schools and environmental adaptations in Syria

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Education is the gateway to full participation in society. It is particularly important for children with disabilities, who are often excluded. The inclusion of students with disabilities in the ordinary education needs to overcome various technical and architectural barriers within schools and community.

With local and international contribution of partners, Syrian ministry of education has started a pilot project for inclusion of students with disabilities in the ordinary education in a 5 traditional public schools, in the year 2002-2003, and began to make environmental adaptations and modifications at schools to ease and enhance the inclusion process. Then two years later, with the support of the project's partners (unicef, krsf, ...), the related involved parties created the accessibility guidelines for designing the educational buildings in Syria, in accordance with the special needs of the students with disabilities (architectural code).

These accessibility guidelines contain scoping and technical requirements for accessibility to sites, facilities, buildings, and elements by students with disabilities. The requirements are to be applied during the design, construction, addition to, alteration, and lease of sites, facilities, buildings, and elements.

The presentation will be illustrated by many examples, and will encourage a lively discussion with the participants through utilization of their collective experience in determining ways of developing and implementing accessibility guidelines and services for students with disabilities.

Keywords: Inclusion, accessibility guidelines, school, students with disabilities.

Exploration of quality of life goals in rehabilitation of persons after spinal cord injury

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Background and Objective: References indicate improved rehabilitation outcomes after interventions based on exploration of personal rehabilitation goals or quality of life goals. The study aim was mapping quality of life goals of persons entering rehabilitation by structured interviews, and study of applicability.

Participants and Methods: Our sample consisted of 102 consecutively admitted persons for their first rehabilitation intervention due to spinal cord injury to the National Institute for Medical Rehabilitation. Structured interviews have been performed for exploration of quality of life goals. Items of the brief version of World Health Organization's quality of life measure and the disability module were used as interview guideline. For study of eventual negative effects on rehabilitation functional outcomes of consecutively admitted persons to the same unit immediately before starting our study and those with finished rehabilitation intervention of our sample were compared. For this purpose the Functional Independence Measure was used. Content analysis of the interviews has been performed as well.

Results: In one quarter of the cases complications and/or psychological instability have prevented inclusion, 10% did not agree with participation in the study. The average length of the interviews has been 41 minutes. No subjects interrupted their participation. The rehabilitation outcomes are better in the intervention group but significant difference has only been measured in the social functioning domain. Quality of life of included persons decreased during the rehabilitation process insignificantly, the autonomy domain showed insignificant improvement, the inclusion domain did not change. Content analysis revealed the outstanding role of the family among quality of life goals.

Conclusion: Our findings indicate that exploration of quality of life goals of persons in early phase of rehabilitation after spinal cord injury is feasible. The selected quality of life measure may well support the interviews.

Key words: Quality of life goals, exploration, spinal cord injury, rehabilitation

Management of neurogenic bladder in the patients with SCI

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Neurogenic bladder or neurogenic lower urinary tract dysfunction (NLUTD) is a common consequence of spinal cord injury (SCI) and can cause significant morbidity and reduce quality of life. The primary aims for treatment of NLUTD are: Protection of the upper urinary tract; improvement of urinary continence; restoration of (parts of) the LUT function; and improvement of the patient's QoL and social integration (1). In addition, patient comfort, convenience and quality of life are important factors in bladder management decisions. Various types of treatment methods including drugs, assisted bladder emptying methods, behavioural modification techniques, electrical stimulation, surgical interventions are used to reach these goals (1-8). Neurourological assesment including history taking, physical examination and investigations including urinalysis, blood chemistry, voiding diary, residual urine determination, free flowmetry, incontinence quantification, urinary tract imaging, urodynamic tests and if available videourodynamic evaluation should be performed.

For improving bladder storage function antimuscarinic drugs administered individually or in combination, orally or intravesically, botulinum toxin injections to detrusor, various types of electrical stimulation, exercises and biofeedback applications for sphincters and pelvic floor muscles are used (1, 2, 7). When the problem is emptying of urine, alpha-adrenergic blockers, intermittent catheterization, and indwelling catheters are used widely (1, 2).

Determination of the appropriate bladder emptying method and frequency according to the storage and emptying function reserve in accordance with the patients life style and choices is the cardinal decision in neurogenic bladder management in patients with SCI. Bladder emptying method may be spontaneous voiding, reflex or triggered voiding, bladder expression (straining) (in well defined patients with regular urological follow-up), intermittent catheterisation (sterile/aseptic/clean), (self/third party), indwelling urethral catheterisation, and suprapubic catheterisation according to the patients conditions (1, 2). The emptying method has significant effect on quality of life of the patients. In a recent study patients voiding spontaneously and using intermittent self-catheterisation reported the best quality of life scores while patients using third party intermittent catheterisation reported the worst scores (6). In patients who have enough bladder capacity and continence for intermittent bladder emptying, the criteria used for the timing and frequency of bladder emptying should be bladder filling sensation if reliable bladder filling sensation is present (5). If bladder filling sensation is not present bladder should be emptied in determined time intervals (emptying at every 6 or 4 hours) (1,2). Determination of the safe retention volumes, monitoring of the emptied volumes and keeping them under the determined safe volume by using appropriate fluid intake regimens are important components of bladder management in patients with SCI.

Choosing the appropriate catheter length, width and type both in patients who are on intermittent catheterisation or indwelling urethral catheterisation will increase the success of the method and patient's compliance to the method and decrease the risk of urethral trauma. Training of the patients about the catheterisation technic and periodic scanning may increase the success of the method and may decrease the risk of urinary tract infection and urinary system trauma (1, 8). In patients who are on intermittent bladder emptying schedule but have incontinence episodes between emptying intervals external collector systems (condom catheters, diapers and peds) can be used to increase quality of life and social integration.

As NLUTD in patients with SCI is a serious problem which can cause significant morbidity and reduce quality of life, periodic follow-up and modifications in the therapuetic approaches are necessary. Because of the instable nature of the NLUTD in patients with SCI dynamic and continuous monitoring of urinary tract function and treatment protocol should be carried out individually according to the patients clinical features.

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Sensorial perception and balance: From the free choice to visual dependence

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Maintaining balance despite unfavourable forces mobilizes different sensorial inputs, mainly vestibular, visual and proprioceptive ones. To be able to organize the motor control, the central nervous system (CNS) needs to be informed about the body's position related to the environment and to itself. Usually there is a redundancy between the different sensorial cues, but a conflict may occur if some of them is non effective, as vestibules when speed is constant. Continuously the CNS analyses, compares a lot of information and has to make choices: select the best source of information depending on the situation and the correct one in case of conflict. Ideally, the choice of the source of information is depending on the contextual need, but this choice is sometimes stereotyped for a given subject. The more frequent of these compartment is the visual dependence style, defined by the excessive value given to the vision against the other sensory inputs even when of poor efficiency or erroneous, being then "counter-productive". In adult subjects, vision is pre-eminent for the control of balance during disturbed situation, as walking in complex environment. Visual dependence of the posture increases with age. The part of the visual information for balance control increases during different pathologies: Parkinson, peripheral vestibular lesion, cerebellar syndrome, post stroke hemiplegia. After stroke the traditional physical rehabilitation seems to reinforce the visual dependence, instead of developing the free choice of other sensory information. It could be important to detect the development of visual dependency early after stroke.

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Biomechanics and design of lower extremity orthoses

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Orthotics is the science and practice of evaluating, measuring, designing, fitting and providing the initial training for using an orthosis. An orthosis is a device which applied to the outside of the body to improve function of the lower extremities, supports a body part, correct or alleviate of neuromuscular, musculoskeletal dysfunction, disease, injury or deficit. For weak muscles, orthosis provides support and for unbalanced muscles it prevents the generation of a deformity or joint contracture. The anatomy and neuromuscular function of the relevant body region of the patient's needs to be well observed to prescribe the specific orthosis. Device is designed for individual use with basic gait and postural analysis and helps patients to control mobility, support the body weight and perform a straight-legged ambulation with the support of canes or a walker. Redistributing the weight forces by using orthosis, may help to relieve pain via reducing the loads on limbs. It can also help to improve bone density, urinary drainage, bowel function, respiratory mechanics, and psychological health. Clinical medicine, basic and applied applications of engineering are synchronized to develop and improve new orthoses. Basic laws of physics and biomechanics with detailed understanding of materials science are essential for effective orthotic design. While the orthosis does not only effect the relevant joint but also interact with all joints and mobile structures in proximal, perspectives of physics such as the distribution of the load / displacement of the center of gravity for human limb positions during different movements (standing, walking, running, etc.) should be take into consideration for a good design.

Fundamentals of family centered care in cerebral palsy: Goal setting and functional therapy

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Cerebral palsy (CP) is one of the most common causes of chronic childhood disability. CP is an umbrella term that defines a series of symptoms related to a lesion of the immature brain. Some of these symptoms are impairments due to the primary brain lesion such as abnormalities of muscle tone, gait and posture. Other aspects of functioning are also affected such as perception, vision, learning and language. Epilepsy and behavioral problems can also be observed (1). The impairments of the children are multiple and varies according to the timing and the degree of the brain damage. Evidence in neuroscience indicates that environmental experience or neuronal activity influences brain connections and structural remodeling after brain injury (2). Mechanisms of neuronal plasticity are more powerful during early development (3). Children with CP need specialized medical care, different kinds of rehabilitation interventions, educational and social services throughout their lives from their families and communities. Experienced service providers who work with close contact with the family obtain the best developmental gains with these children (4). Parents are the key people for the growth and development of the children with CP who need specialized interventions such as enriched environment for enhancing perception, keeping the joints in functional positions, preventive stretching, infant massage and goal directed daily living activities.

In family centered care (FCC), family of the child is considered to be at the center of the therapy approach. Evaluation of the family is the first step; the strengths and needs of all family members are investigated. The most frequent family needs were assessed in a large scale study in 2010; over 50% of parents of children and youth with CP expressed needs for information about current and future services, planning for the future, help in locating community activities and the need to have more personal time (5). In FCC; the parents feel that they are respected and well supported by the rehabilitation team. Highly risk infants and early diagnosed children with cerebral palsy are the best candidates for family centered care programs. The parents are empowered to take responsibility and to be equal partners in the decision making process. One of the fundamental elements of the family centered care is the goal setting procedure. The parents are active participants of the evaluation of their own children's motor development. The Gross Motor Function Classification System (GMFCS) is considered as the gold standard for classifying the movement ability of children with cerebral palsy (6). GMFCS Family Questionnaire provides a basis for informing parents about prognosis and setting treatment goals to respective GMFCS levels (7). After being informed about the treatment options, the parents as well as the children are well motivated to promote the initiation and persistence of goal directed motor behavior. Evidence from neuroplasticity literature has identified motivation as a critical modulator of functional plasticity. Neural reorganization occurs at the molecular and behavioral level and is responsive to factors such as development, the environment, disease, and therapy (8).

Family-centered functional therapy (FCFT) was developed by the CanChild multidisciplinary research team from McMaster University (9). Family-centered philosophy concepts and dynamic systems theory approach are integrated for the management of children with CP. Focusing treatment directed at functional goals is the second fundamental element of family centered care in CP. Functional goals are identified by the parents and the child, with the collaboration of the rehabilitation team. The main principles are defining periods of change, identifying and changing the primary constraints in the task, the child or the environment that are preventing the child to achieve functional goals, and providing opportunities for practice in functional contexts. Compensatory movement strategies are considered as well as encouraging the children and the families to participate in play and sports activities that will help to maintain flexibility, strength, and coordination (9). Basic motor abilities and self-care improved in young children with CP after goal-directed activity focused physiotherapy with involvement of their local environment, and their need for caregiver assistance in self-care and mobility decreased (10).

In conclusion, there is growing evidence about family centered care in children of CP. The fundamental elements of FCC is goal setting with the collaboration with the family and the rehabilitation team. The second important element of FCC is to enhance the motor development by improving the child's function based on realistic, meaningful and goal directed daily living activities (11).

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Challenges in the rehabilitation of cognitive functions

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Cognitive deficits have a major impact on social and professional integration of brain-damaged patients. During the last decade we have witnessed striking advances in the understanding of brain organization, the development of diagnostic tools and the accumulation of evidence for efficacy of rehabilitation interventions. Several of these studies point out the necessity to understand better the neural mechanisms which underlie rehabilitation interventions. Training-induced plasticity, as demonstrated in normal subjects for several cognitive domains, may well be at the origin of recovery of cognitive functions following brain damage. However, there is increasing evidence that rehabilitation interventions in brain-damaged patients harness also other, lesion-related mechanisms. Thus, it will be essential to investigate further the organization of specialized networks, their disruption in brain-damage and the effects of rehabilitation interventions on their reorganization.

Vocational rehabilitation

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A return to work is a pathway to health and financial wellbeing. Whatever the job, paid or unpaid, work benefits people. As occupational beings it bestows in them a sense of purpose and reward and is good for health.

In the UK, economic drivers including an ageing population, the obesity epidemic and its subsequent impact on related disease, coupled with the known detrimental effects of worklessness have resulted in radical reform of the benefits system and a rise in the retirement age. Whilst some people choose to work in later life, many people in the UK also have to.

For people with long term neurological conditions (LTNC), such as stroke or traumatic brain injury returning to or remaining in work is a primary rehabilitation goal; not least because many are young or have dependant families.

As health care professionals we have a duty to ensure that all those who have the capacity to work are afforded the opportunity to do so, yet evidence to suggest how best to achieve this is lacking.

Although deficits resulting from LTNC can affect the ability to work, beliefs and attitudes about work and the way rehabilitation services are organised and delivered may pose greater barriers. Preventing job loss requires timely intervention. Vocational rehabilitation services need to intervene early after injury or diagnosis to ensure that the door to an existing employer remains open and respond rapidly to changing needs over time. A model of early specialist health based vocational rehabilitation is proposed.

Using technology to support the care and rehabilitation of people with cognitive impairments

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The management and care of people with acquired brain injury or dementia who have cognitive impairments, is a major challenge. Current best practise in the United Kingdom aims to provide sufficient support to enable the individual to live independently in their own home or the community.

Acquired brain injury often occurs in younger people, apart from any physical disability, the individual may have abnormal cognition, behaviour or emotional expression. Rehabilitation strategies aim to provide a supported living environment to allow time for recovery to occur and establish compensatory strategies. In many cases recovery is incomplete and additional support is required to ensure the individual is safe and carries out activities of daily living, before they can be discharged into the community. People with mild to moderate dementia have impaired short term working memory and are often unable to initiate or complete activities of daily living. As the disease progresses, they may exhibit loss of time or place orientation and may not be able to live independently and safely in the home.

Smart home technology (integrated technology fitted in a building that supports and assists users through automation, prompting and alerting) offers the promise of allowing elderly and those with physical disabilities to live independently in their own homes (Martin et al., 2008, Evans et al 2011). The technology is still in the early stages of development and some reviews (Brandt 2011) have concluded that there is limited evidence on the efficacy of smart home interventions for people with disabilities. However, it is apparent that much of the technology is still too difficult and complicated to use and has not been optimised for a domestic environment (Dewsbury and Lindskill 2011).

An alternative approach is to utilise simple independently operated technologies in different locations around the home. These can provide pre-recorded voice prompts to reinforce or prevent specific actions or behaviours or provide a visual indication of time of day or night. These devices are inexpensive and widely available, but to date, there is limited evidence as to their effectiveness. The Bath Institute of Medical Engineering is working with a range of clinical partners to develop and evaluate the benefit of these technological interventions for people with cognitive impairments. These range from home automation systems to simple stand alone devices. The range and application of these will be discussed, along with the selection criteria and the challenge of recording appropriate outcome measures.

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Peripheral nerve imaging studies in rehabilitation setting

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Peripheral nerve disorders are one of the challenging issues in rehabilitation medicine. The diagnosis of any kind of peripheral nerve disorder is generally based on clinical findings. Diagnostic studies for suspected neuropathy have commonly included blood tests, nerve conduction studies, electromyography, and biopsy. However there have been certain developments about imaging studies for past 10 years. This topic will review the use of imaging studies particularly ultrasound (US) and magnetic resonance imaging (MRI) for the diagnosis of peripheral nerve disorders.

MRI provides excellent soft tissue contrast and can demonstrate the anatomy of a specific nerve region. It can also show secondary changes of denervation in affected muscles. MRI of peripheral nerves, also referred to as MR neurography (MRN), is increasingly being used in clinical routine because of advances in MRI hardware. Studies have shown that MRN findings may substantially influence the management of patients with peripheral neuropathies. The other special techniques about MRI are diffusion tensor imaging (DTI) and tractography which use measurements related to the molecular motion of water to provide architectural organization of the tissue. These techniques could have clinical applications particularly in nerve entrapments beside their promising capability for researches.

Over the past 10 years, high-frequency ultrasound (US) has been used increasingly by physiatrists for diagnostic and therapeutic purposes. US helps the diagnosis of musculoskeletal conditions such as tendinitis, tendon and ligament tears, arthritis, cysts, tumors, and also provides image guidance for therapeutic procedures such as aspiration or injection. US also can be adjunctive or alternative tool in the evaluation of neuromuscular disease. Nowadays, US has become a low-cost alternative to MRI for diagnosis of entrapment neuropathies. Nerve morphology and echotexture can be effectively assessed by US. Larger and superficial nerves such as median nerve and the ulnar nerve can be easily identified. However, smaller and deeper nerves require more technology because of penetration limitations and also more user experience. Therefore the literature of utility of US in diagnosis of nerve entrapment is focused on especially in carpal tunnel syndrome (CTS) and ulnar nerve entrapments.

The challenging issue for US is about training. The training standards for US have not been constituted. Good knowledge of anatomy, ultrasound physics, and a high level harmony with the device to minimize artifacts and get better quality is essential in training. The physiatrists are candidates for being user of musculoskeletal US especially in the field of neuromuscular diseases with their skills and knowledge.

Special rehabilitation protocols for low back surgery

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Minimally invasive spine surgery produce pain relief for the patient but muscle performance and re-conditioning through rehabilitation procedures are still very important for patient's recovery.

In the spine muscle performance involves muscle strength, endurance and stability. Therefore careful follow-up in terms of muscular stretching and segmental stabilization is necessary after surgery. Although importance of the exercise program is very well documented, it's still unclear what exact components should be included in rehab protocols and what should be the optimal activity level in early stage. Newsome et al (1) published the results of an immediate exercise protocol following lumbar microdiscectomy. In their study, patients commenced passive flexion of hip and knee 2 hours following operation and they were assisted to mobilise out of bed within the fifth hour following surgery. They conclude that, immediate commencement of exercises following microdiscectomy may enable patients to be active earlier and return to work sooner.

Tarnanen et al (2) evaluated the effectiveness of a long-term rehab program after lumbar spine fusion. They started the exercise intervention 3 months after surgery and assessed the effectiveness of a combined back specific and aerobic exercise intervention. The results of another Meta-Analysis (3) of Core Stability Exercise versus General Exercise for Chronic Low Back Pain showed that core stability exercise is more effective in decreasing pain in the short-term.

Since there is no consensus on the timing and on the content of the exercise protocols; in this session it's the purpose to study and to discuss the appropriate procedure after low back surgery. To my opinion, exercise protocols must be planned according to stages of recovery. (4-7) For example during the "Early Protection Phase" which includes the 1st week of post-operation period, the goal should be the protection of painful region and Kinesthetic Awareness should be limited by education of Safe Movement.

Second stage of post operation rehab is within the 2nd and 6th weeks of back surgery which is "Early Training Phase" and maximum to moderate protection is needed. Goal must be limited to "Learning neutral spine, proprioception training of movement and posture".

Third stage is "Basic training-controlled motion phase" which includes the 6th and 12th weeks of back surgery. At this stage kinesthetic awareness should include dynamic maintenance of pain-free position with activities.

"Advanced Training" phase starts by the 12th week of back surgery. Goal may be to use neutral spine in all functional activities, stabilization with dynamic trunk strengthening and aerobic training. I think, the result of a very well defined protocol will have practical value in the planning and development of treatment options after microinvasive low back surgery.

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Functional MRI in rehabilitation

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Diagnostic imaging has a crucial role in the diagnosis and in the follow-up of many central nervous system disorders that could eventually be related with physical medicine and rehabilitation. Lesions causing neuronal damage even destruction or distortion such as tumors, developmental vascular abnormalities, arterial / venous ischemic insults, hemorrhages can easily be shown by imaging techniques.

Because of its prevalence, arterial stroke is the main interest of rehabilitation. Early diagnosis, treatment and rehabilitation are the main goal in the management of arterial stroke. The role of imaging in the clinical stroke medicine are providing the territory, extension and the nature of the stroke lesion. Various techniques of magnetic resonance imaging (MRI), such as diffusion weighted imaging (DWI) and perfusion weighted imaging (PWI) provide information about cytotoxic edema and microvascular blood flow within brain tissue, respectively. Combination of DWI and PWI help to determine the penumbra that is potentially salvageable by thrombolytic therapies. Magnetic resonance angiography (MRA) is important in the evaluation of the vascular origin of the stroke. In the post-acute and chronic phases, diffusion tensor imaging (DTI) and functional MRI (fMRI) offer the ability to detect alterations in axonal pathways and brain activation. Given the spectrum of deficits exhibited by stroke patients, the variability in location, and extent of ischemic stroke, fMRI helps our understanding the association between the lesions in specific brain locations and behavioral deficit. For stroke patients, improved knowledge of how damaged neuroanatomical structures relate to behavioral deficits can potentially be important for refining cognitive and physical rehabilitation strategies, in the long term.

Functional MRI

Blood oxygenation level-dependent (BOLD) fMRI has revolutionized neuroscience through its capability to measure signal changes associated with neuronal activity generated by sensory stimuli, or by behavioral tasks involving memory, cognition, action, or emotion. Neurons communicate with glial cells and the nearby microvasculature to signal for the delivery of additional blood through vasodilation, when neuronal activity levels increase. The neurovascular unit that governs such processes represents the ultimate spatial resolution achievable with hemodynamic measures of brain activity, in the range of hundreds of microns. Researchers have determined that the local field potentials arising from healthy populations of neurons are strongly correlated with BOLD-fMRI signals.

BOLD signal characteristics are a complex function of multiple physiological parameters such as cerebral blood flow (CBF), cerebral blood volume (CBV), cerebral rate of metabolic oxygen consumption, and hematocrit. The key property used for generating fMRI, through which these other parameter changes are viewed, is the effect of oxygenation status on the net magnetic susceptibility of blood (oxyhemoglobin is diamagnetic and deoxyhemoglobin is paramagnetic).

Functional MRI could be performed either associated with a particular behavioral task (task-based fMRI) or during the resting state.

Task-based fMRI: In the task-based fMRI, the simplest approach is to alternate between one specific stimulus (task) and a resting condition (often visual fixation on a displayed cursor). When the stimulus/task is very brief (approximately 0.1–4 s), the experimental design is described as “event-related,” whereas longer duration task and control condition periods (typically 15–30 s) are used in “block-designs”. In stroke recovery research, the majority of fMRI studies have used a block-design primarily because the block-design affords greater detection sensitivity.

There have been numerous seminal fMRI studies that have helped to characterize brain activation patterns that indicate positive or negative outcomes after stroke. The findings of poor recovery are significant activation in the unaffected hemisphere (i.e., contralateral to the side of the lesion) when performing a unilateral task with the affected limb, and diffuse activation of brain regions during the execution of a motor task.

One of the challenges of task-based fMRI in stroke recovery research is the issue of task performance. It is important to characterize properly what the patient “does” during fMRI, to rule

out the possibility that their activation patterns are different from normal individuals simply because they did the task differently (e.g., speed and extent, applied force, and level of cognitive effort when performing a motor task). In this case fMRI findings could be supported by other relevant biophysical tests, such as electromyography (EMG) or electrodermal activity (EDA).

Despite the wealth of information that can be gained in such studies, use of task-based BOLD fMRI to study brain activation in individuals with cerebrovascular disease is not without controversy. Recalling that BOLD signal changes are influenced by factors such as CBV, CBF, and the cerebral rate of metabolic oxygen consumption, pathological changes in these parameters that affect fMRI signals may be mistaken for changes in neuronal activity.

Another challenging issue associated with task-based BOLD-fMRI relates to observations of absent BOLD signals despite evidence of existing neuronal activity recorded by an alternative functional neuroimaging modality. The absence of task-related BOLD signal was suggested to arise from impaired autoregulation of cerebral perfusion, secondary to cerebrovascular disease.

Resting-state fMRI : Resting-state fMRI (rs-fMRI) is a method for human brain mapping that has recently been used. A major advantage of rs-fMRI is that it does not require the patient to perform a behavioral task as part of the examination. Thus, concerns regarding abnormal behavioral performance of patients are removed. Brain activity in the resting state is estimated not by task performance, but by low frequency synchrony in the baseline fMRI signal between different brain regions.

Early postoperative management in lower limb amputees

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Postoperative rehabilitation begins as soon after the emergent amputation as possible. The main goal of rehabilitation is to prevent any complications of immobility after the amputation procedure. Following amputation, the amputee may have difficulty in coming to terms with the residual limb. Handling the residual limb should first be attempted by the amputee, before either assistive or resistive exercises handling the residual limb is also helpful to improve of desensitising.

After amputation pain is felt in the residual limb or in the phantom limb or both. There are some modalities to control of pain. These are pharmacological treatment, surgical treatment, physiotherapy, acupuncture, psychological therapy. The most frequently method used in physiotherapy modalities are massage, electrical stimulation, hydrotherapy and fluidotherapy are used to control of pain. Desensitization techniques, phantom exercises and mirror therapy, breathing and relaxation exercises are the other frequently methods used in physiotherapy. If weight bearing exercises are necessary because of the amputation techniques such as Syme's, Ertl's and knee disarticulation, distal gently pressure or partial weight bearing is given at the beginning and then full weight bearing exercises are continued.

Prevention of contractures is important at the early postoperative management. Prevention of knee flexion contracture in transtibial amputee, the knee must rest in full extension and elevation after the operation. In following days sandbags are used to maintain full extension position. The short transfemoral stump can also become abducted as a result of the pull of the gluteus medius and gluteus minimus. Pillow should be removed under the residual limb and kept in neutral alignment.

Residual limb edema reduction is the other component of early postop management. Method of treatment of residual limb edema is elevation, exercise and pressure methods such as bandaging, shrinker socks, rigid dressing, pneumatic mobility aids.

Elastic bandage is easily obtained at a minimal cost to patient and is easily accessible to the staff if it is kept in physiotherapy department or hospital supply room. Careful patient and family instruction is necessary because poor wrapping leads to skin problems and a poorly shaped stump. Shrinker socks are used for the healed residual limb with edema and advisable that provide uniform compression.

Aims of the rigid dressing technique which is used in early postop period, are reduction of edema, protect the wound from bed trauma, enhance wound healing and early maturation of the stump, decrease postop pain and provide early gait training. Rigid dressings may be plaster socket, resin lamination socket or thermoplastic socket. Immediate Post Operative Prosthesis (IPOP) with cast socket is an early stage application on the operating table. Applications of IPOP are needed professional skills and knowledge in fabrication for each amputation level. Today we use the modifications of RRP (Rigid Removable Prosthesis) such as conventional, pneumatic and silicone liners. Conventional custom made RRP is applied together with cast or thermoplastic socket such as Halmstad or Habermann applications. The rigid socket is also used with silicone liner, immediate or after removal suture. Firstly Early Prosthesis Using Silicone Liner (EPOPS) is introduced by Terakada et al in 2004. The other application of RRP is together with pneumatic system. RRP with pneumatic used either frame laminated or thermoplastic sockets. The system has both stiff knee and free knee applications. These are prefabricated applications such as Ppam, Saarbrücker and Tulip limb (stiff knee), Ama (with free knee). RRP with pneumatic applications can be used from 5-7 days postoperatively while the sutures are still in the wound. Pneumatic applications are not forward or home use.

Independent transfer, bed mobility and balance should also be achieved in amputee. Successful prosthetic training is related with successful early postop management and preprosthetic exercises. In addition to active exercises, isometric for amputated side, active-resistive or resistive exercises for all lower and upper limbs are given. Pelvic mobility and dynamic exercises are generally used. Trunk flexors and back extensors are actively treated.

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Functionality and prosthetic prescription in lower extremity amputations

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- An Amputation is the removal of a limb or appendage or outgrowth of the body. Disarticulation is the amputation through a joint. The portion of the limb after that remains after amputation is called as "residual limb".
- The types of lower extremity amputations are Transtibial, knee disarticulation, transfemoral, hip disarticulation, hemipelvectomy and hemiporectomy. If we do skip foot amputations, the most frequent lower extremity amputation level is transtibial (54%).
- There is no absolute contraindication for prosthetic prescription, including age. For the ones who will unable to walk (severe CVD, stroke, age), we should consider a cosmetic prosthesis, because of body image and socialization. The relative contraindications are severe cognitive deficits, severe cardiopulmonary limitations, neurologic disorders with residual deficits in balance, coordination, vision or strength, severe and intractable pain in the residual limb aggravated by contact with prosthesis, active alcohol or substance abuse interfering with learning and safety, chronic or recurrent skin breakdown, particularly if related to infection, and significant (>30°) flexion contracture of hip or knee, nonresponsive to ROM/streching.
- Time up & go test, 6 minutes walking test, 10 mt walking test measure the mobility. The locomotor capability index and Houghton Scale measure function but they do not differentiate the problems of very active patients. The Amputation Related Body Image Scale (ABIS) is an amputee spesific quality of life index, and measures body image disturbances. In recent years, ICF is gaining popularity and advocated by WHO.
- Although, there are many new types of prosthetics with smart Technologies, the main goal should be to erect and maket he patient to able to walk. The budget is also very important in decision making.

Oral & Poster Presentations

[S-001]

In-house early rehabilitation in severe brain trauma: Results, effectiveness and deriving concepts

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Objective: To determine the effectiveness of the direct transfer from the intensive care unit (ICU) to the Interdisciplinary Early Rehabilitation Unit (IERU) in severe Traumatic Brain Injury (sTBI) patients.

Materials-Methods: In a setting of multimodal IERU at a level-I trauma centre, 130 survivors of sTBI were studied prospectively, using the Extended Barthel Index for weekly assessments. Clinical and brain morphologic variables were tested in multivariable logistic regression models to determine the predictors of outcome.

Results: Between 1999 and 2004, 93% of patients had a sTBI and were treated in our ICU for 30 days; 75% were male, the most common aetiology was traffic accident (60%). Sixty-five per cent suffered polytrauma; assisted ventilation was required in 47 patients; 37 patients had Methicillin-resistant staphylococcus aureus. Seventy-three per cent of the cases required surgery during the IERU-period. The mean total duration of treatment was 72 days; by the end of the treatment, 30% of patients were in good condition and 32% were discharged in excellent condition. Eight per cent of patients remained in vegetative state; one patient died. The duration of treatment and the functional outcome were highly dependent on the patient's clinical condition and the lesion pattern at admission, as well as on age.

Conclusion: In-house early rehabilitation of patients with sTBI following management in the ICU was found to produce comparable outcomes to management of patients in other facilities. Nevertheless, only 4% of German hospitals are pursuing this model. It is cost-effective with regards to health insurance, as the shorter period of ICU management results in a shorter period of hospital management overall. Resistant micro-organisms rates subsequently fall. Transfer times between different levels of rehabilitation are reduced, and the use of resources becomes more efficient, particularly for surgical interventions. For us, the initial intensive treatment of sTBI has now become the stepping stone to early rehabilitation.

Keywords: Early rehabilitation, severe traumatic brain injury, cost-effectiveness

[S-003]

Evolution of sensory reweighting for balance control after stroke

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Objective: Continuous re-weighting of sensory information is required for a flexible control of upright stance. We recently showed that patients after recent stroke may be highly dependent on visual, proprioceptive and/or vestibular information. The aim of this study was to describe the evolution of these sensory compartments.

Materials-Methods: 28 subjects with a first and unique hemispheric stroke (age = 53.7 years, SD 10.2, 18 men, right lesion = 13) and 20 control subjects (age = 51.7 years, SD 13.9, 12 men) were studied. Postural control while standing at rest was probed successively with tendon vibration, visual optokinetic and vestibular galvanic stimulations. Patients were investigated on average 2 months after stroke, using a force platform (Technoconcept®). Patients and controls were retested 1 month later. Analysis was conducted from composite scores for each sensory stimulation as the mean of the absolute values of the displacement of the centre of pressure in the different directions.

Results: Both control and stroke patients showed large inter-individual variations. Patients were globally more sensitive than controls (mean global score=48.1, SD 17.9 versus 31.94, SD 12.7, p=0.001). They were excessively reliant on visual information (p=0.002) and to vestibular stimulation (p=0.040). While the scores were reproducible at one month in controls, patients displayed different kinds of evolution, sensory dependence remaining in most of them, but decreasing for some and even increasing for a few of them.

Conclusion: Post stroke development regarding sensory reweighting is a complex and evolving process. Better knowledge of this process is needed to design personalized rehabilitation programmes.

Keywords: Stroke, balance, rehabilitation, sensory profile

[S-002]

Use of mini-bestest for balance assessment in patients after stroke – A pilot study

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Objective: To determine whether the Mini-BESTest, which is the short version of the Balance Evaluation System Test (BESTest) and includes important aspects of dynamic balance, is comparable to the Berg Balance Scale (BBS) when assessing balance in patients after stroke.

Materials-Methods: Our pilot study involved 14 stroke patients who met the inclusion criteria: first stroke and ability to follow instructions (MMS at least 25). Mini-BESTest (in which a 4-level scale, 0-3, was used upon the author's agreement), BBS and 10-Meter Walk Test were performed at admission and after four weeks of treatment. The scores of the three tests were compared using exact Wilcoxon matched-pairs test, and Pearson correlations among Mini-BESTest, BBS and 10-Meter Walk Test were estimated.

Results: Mean time from the onset of stroke was 45 weeks; patients' mean age was 57 years; 10 patients had left and 4 had right-side impairment. Mini-BESTest mean score at admission was 17.5 (range 0-39); at discharge it improved to 21.3 (range 1-40) (p<0.01). BBS mean score at admission was 38.9 (range 4-56); at discharge it improved to 45.9 (range 10-56) (p<0.01). Pearson's correlation between BBS score and Mini-BESTest score at admission was 0.82 (p<0.01). Nine out of 14 patients scored more than 41 points on BBS, indicating good balance, in comparison to 6 out of 14 patients who scored more than 20 points on Mini-BESTest, indicating low risk of being a faller. Pearson's correlation of BBS score and Mini-BESTest score with 10-Meter Walk Test at admission was -0.38 (p=0.18) and -0.57 (p=0.03), respectively.

Conclusion: The results of our preliminary study suggest that mini-BESTest is highly correlated with BBS but it is more sensitive when assessing patients after stroke (in whom the use of BBS is subject to ceiling effect).

Keywords: Mini-BESTest, Berg Balance Scale, balance, stroke

[S-004]

Which factors influence long term survival, functioning, and well-being after stroke – Results from two different stroke inpatients rehabilitation samples

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Objective: Many studies investigated the impact of acute treatment, and specific secondary prevention on long-term survival and functional outcome in stroke. But the impact of stroke rehabilitation is rarely studied. In two different patient samples followed up for over 5 years, we monitored mortality, functioning, participation, and health-related quality of life (HRQoL).

Materials-Methods: 135 stroke rehabilitation inpatients of our clinic had been followed up in the CERISE (follow-up) study (initial total sample n=532) for a prospective comparative evaluation of stroke rehabilitation in four European countries. The patient cohort was monitored for mortality, motor and ADL functioning, living situation, and affective comorbidity by performing home visits and assessments five years after discharge from postacute rehabilitation. In another sample (n= 229) discharged with further need of care, we monitored morbidity, living situation (at home), and use of care and medical services by performing telephone interviews. The data at 2.5-year follow-up are presented.

Results: In both samples, stroke inpatient rehabilitation after acute treatment significantly reduced long-term mortality compared with the published data from unselected stroke patient samples. CERISE follow up data revealed that better functional and motor outcome six months after stroke significantly reduced mortality in the five-year perspective. Being independent in dressing and bathing at discharge from stroke rehabilitation increased the chance to maintain functional independence. In the second sample, HRQoL measured by EQ5D at discharge had better prognostic value regarding survival and participation at home than higher functional status and higher BMI.

Conclusion: Our data give evidence that stroke rehabilitation following acute treatment can reduce long-term mortality. Stroke rehabilitation should aim to improve motor and ADL functions and HRQoL to the maximum possible extent because these are the most important factors for long-term survival, functioning, and well-being.

Keywords: Stroke rehabilitation, long term outcome, impact on mortality, functioning, health-related quality of life

[S-005]

Mirror-neuron system recruitment by action observation in stroke rehabilitation

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Objective: To identify a reliable electrophysiological marker of mirror-neuron system (MNS) recruitment that can be used for physiological monitoring of rehabilitation treatment employing action observation (AO), and to explore the relationship between behavioral and neurophysiological responses to AO.

Materials-Methods: Mu suppression, an electrophysiological marker thought to represent activation of a cortical MNS, was analyzed in 27 healthy controls and 33 stroke patients during execution and observation of reach and grasp activity. Normalized lesion data were obtained by processing high-resolution follow-up CT scans with the ABLE/MEDx software. Kinematic analysis of hand movement performed immediately after observation of a similar movement was compared to the movement done immediately after observation of movement in the opposite direction. The movement was performed under EEG monitoring in both conditions. Two standardized tests (Fugl Meyer, Box-and-Blocks) were used to assess arm function.

Results: In healthy subjects, both observation and execution of movement induced suppression in the lower mu range (8-10 Hz) that was maximal over the sensory-motor cortex. In the patient group, AO revealed less suppression in the affected hemisphere compared to the unaffected hemisphere. The magnitude of suppression in the lower mu range correlated with the extent of damage to the inferior parietal cortex (a region where populations of mirror neurons were found in macaque monkeys). Kinematic analysis of hand movement showed that deviation from the straight line diminished after observation of movement in the same direction. However, this and other kinematic measures showed a large inter-personal variance.

Conclusion: Suppression in the lower mu range is a valid marker of MNS recruitment by AO. This measure of the brain's physiological response, when combined with kinematic analysis of simple movements and standard measurement of motor function, is an important tool in the study of AO role in stroke rehabilitation.

Keywords: EEG, mu-suppression, mirror-neurons, action observation, stroke

[S-006]

Pulsed ultrasound for speed healing after internal fixation of tibia fractures – Results from the randomized PUSH-IT trial (ISRCTN90844675)

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Objective: There is evidence that low-intensity pulsed ultrasound (LIPUS) is effective in treating long-bone non-unions. It is, however, unclear whether LIPUS can also accelerate bony consolidation after internal fixation. In this randomized trial, we studied whether early daily self-application of LIPUS leads to higher union rates and improved health-related quality of life compared to the standard of care three months after surgical treatment of tibia fractures.

Materials-Methods: Men and women aged ≥ 18 years covered by the German Social Accident Insurance for the Administrative Sector (VVG) who had sustained a closed, unilateral tibia fracture and underwent plating or intramedullary nailing were eligible to participate in this trial. After IRB approval and informed consent, patients were centrally allocated by a block randomization scheme to daily, self-administered LIPUS application up to three months after surgery plus comprehensive rehabilitation until full weight bearing, or to rehabilitation alone (standard of care). The primary endpoint was radiographic healing, as determined on plain radiographs after 3 months. Secondary endpoints included healing after 6 months, Short-Form 36 physical (PCS) and mental (MCS) component scores, and the EQ-5D VAS and Utility Index 3 and 6 months after randomization.

Results: Of the 89 randomized patients, data from 32 LIPUS and 27 control subjects (41 men, mean age 45, SD 10 years, 29 diaphyseal fractures) were evaluated. LIPUS had no influence on partial or full fracture consolidation after three months (overall risk ratio [RR] 1.04, 95% confidence interval [CI] 0.97-1.11; diaphyseal fractures only: RR 1.09, 95% CI 0.92-1.29). Patients in the LIPUS and control group showed no relevant or statistically significant differences (as determined by repeated measures MANOVA) during longitudinal assessment of SF-36 PCS, SF-36 MCS, or EQ-5D.

Conclusion: Self-administered LIPUS-application neither accelerates healing nor affects measures of health-related quality of life or health utility 3 and 6 months after internal fixation of tibia fractures.

Keywords: Low-intensity pulsed ultrasound, tibia fractures, bone healing, health-related quality of life, health utility

[S-007]

Hypersensitive fingers in female patients with rheumatoid arthritis: Reflections on clinical, laboratory and functional measures

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Objective: The hand is the main target in many rheumatic diseases such as rheumatoid arthritis (RA) and osteoarthritis (OA), and it is the main tactile sensory organ that is uniquely designed for fine motor activities. We aimed to assess the quantitative median sensory and motor function of the patients with RA and compared it with healthy normal controls (HNCs) and patients with OA to investigate the possible relationships.

Materials-Methods: Disease activity score of 28 joints (DAS28), health assessment questionnaire (HAQ), radiographic Larsen score and laboratory test results were recorded in RA patients. QST of the median nerve including Semmes-Weinstein (S-W) touch pressure thresholds, 2-point discrimination (2-PD) test, and pinch strength measurement were performed in all subjects.

Results: Seventy-two female RA patients (mean age 55.9, SD 9.5 years), 43 female OA patients (mean age 58.9, SD 4.8 years), and 39 female HNCs (mean age 56.6, SD 5.8 years) were recruited to the study ($p=0.080$ for mean age comparison). All patients with RA have used synthetic DMARDs. S-W touch-pressure thresholds were better in RA patients than in OA patients and controls ($p=0.028$). 2-PD results were better in controls than in patients with OA ($p=0.041$). In a multiple linear regression analysis of patients with RA, the significant predictors ($p<0.05$) of the S-W touch pressure threshold of median nerve were duration of disease, DAS28, HAQ, rheumatoid hand deformities and laboratory parameters including CCP, RF, CRP and platelet count.

Conclusion: Future studies are needed to determine the effect of pharmacologic and non-pharmacologic strategies on the hypersensitive fingers in RA. In particular, the effects of biologic DMARDs of RA or drugs for neuropathic pain on the sensory dysfunction in rheumatoid hands should be investigated.

Keywords: Rheumatoid arthritis, osteoarthritis, hand, quantitative sensory testing

[S-008]

The lifestyle management for arthritis programme (LMAP): Long-term follow-up of a randomized controlled trial in inflammatory arthritis

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Objective: The LMAP is a group self-management programme of two modules (weekly meetings: 4 x 2.5h) plus review (2h). Module A includes: arthritis information, joint protection and fatigue management; and module B: exercise (flexibility, strength, walking programme, Tai Chi for Arthritis), foot care, pain and stress management. A randomized parallel group trial ($n=167$) demonstrated significant improvements at 12 months in pain, perceived control, self-efficacy and self-management in people with early inflammatory, rheumatoid or psoriatic arthritis, compared to a standard arthritis education programme (SAEP: 10 hours). In this study, we evaluated the LMAP's long-term effects.

Materials-Methods: At 6.5 years (y), the participants completed the trial postal questionnaire including: pain 10cm scale; Multi-dimensional Health Assessment Questionnaire (MDHAQ: function, psychological status, perceived control), arthritis self-efficacy scales, adherence with self-management. Mean change (SD) scores from 0-6.5y were compared between groups using ANCOVA, with baseline scores as covariates. Data were analysed as a) completers only and b) missing cases' data imputed (estimation-maximization method, 25 iterations using IBM SPSS v20 software).

Results: 58% responded, 54 (63%) LMAP and 43 SAEP (53%) participants. There were no statistically significant differences in baseline characteristics of responders versus non-responders or response rates between groups. Among completers, the LMAP group had better use of joint protection ($p=0.03$), with no other statistically significant differences. After multiple imputation, the LMAP group had better self-efficacy for self-management ($p=0.05$), self-reported use of joint protection ($p=0.001$) and exercise (although less than at 12 months; $p=0.05$).

Conclusion: The LMAP led to some long-term benefits in improved self-efficacy and use of self-management. Higher self-efficacy is associated with better health status (Cross et al, 2006, Rheumatology 45(1):92-6) although in this study other benefits, particularly improved pain, were not sustained. We recommend evaluating the effect of booster sessions. A limitation was the high drop-out rate.

Keywords: Inflammatory arthritis, patient education, self-efficacy, health behaviour change

[S-010]

The importance of the choice of radiation parameters and application site for the efficiency of laser therapy in inflammatory musculoskeletal diseases. A placebo-controlled double-blind follow-up: Long-term effects

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Objective: The clinical evidence for low-level laser therapy (LLLT) in rheumatoid arthritis (RA) patients is controversial and consisting of studies presenting ambiguous conclusions. The latest findings indicate that power density (PD) and energy density (ED) are more important than energy dose in LLLT efficiency. Recent data propose a novel therapeutic modality with extremely low PD (about 0.15 mW/cm²) referred to as ultra- or very low level laser therapy (ULLLT/VLLLT). Of particular importance in musculoskeletal pathology are the application site and location-specific doses. The Disease Activity Score (DAS28), extensively validated during clinical trials in RA patients, has never been used in LLLT studies before. Our aim was to examine the long-term effect of pulsed infrared VLLLT in a randomised, placebo-controlled double-blind investigation in an acute RA stage by monitoring the DAS 28 index and functional activity score (HAQ).

Materials-Methods: According to ACR criteria, 136 RA patients belonged to the treatment and 29 to the placebo-control group. VLLLT parameters were applied in individually assessed doses for 3 cycles, each consisting of 10 consecutive days. The cycle interval was 5.9 (SD 1.8) months. The energy dose per treatment ranged from 0.5 J to 7.32 J ($\lambda=890$ nm, max. pulse power 7 W, 60-240 s per point). The PD was 0.1-2.0 mW/cm², ED 0.008-0.16 J/cm² depending on the selected frequency pulse (80-1500 Hz).

Results: The treatment group showed significantly and progressively decreased values of DAS 28 and HAQ activity after each cycle. The effect was maintained by the beginning of the following series regarding DAS 28 ($p<0.001$) and HAQ ($p<0.001$), whereas in the placebo group both outcome measures increased ($p<0.01$). HAQ level was positively correlated with the RA DAS 28 score in all categories.

Conclusion: This placebo-controlled long-term investigation demonstrated that under optimal chosen irradiation parameters and application sites, VLLLT has a prolonged effect in decreasing RA activity and improving functional activity even in high-activity RA patients.

Keywords: Very low level laser therapy, energy density, energy dose, application site, rheumatoid arthritis

[S-011]

Patients' participation in rehabilitation research

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Objective: Politics advocate the integration of patients in coordination processes within the health care system as well as in decision-making about diagnostics and therapy – both as a means of individual participation. The UN Convention on the Rights of Persons with Disabilities (UNCRPD) focuses on inclusion in all relevant decisions and processes around disability. Patients' and disabled persons' participation in research projects is a next step to fulfil this democratic goal.

Materials-Methods: The concepts essential for rehabilitation are introduced that are germane in the context of participatory rehabilitation research. They are based on the results of two workshops where researchers, patients and those working in the field developed ideas for patients' participation in research and on a screening of relevant literature. The workshops were organized by the German Association for Rehabilitation (DVfR) and the German Society for Rehabilitation Sciences (DGRW).

Results: A stage model allowing design and documentation of patient participation is introduced. Consultation, collaboration and control describe the role of the patients with respect to their organizations within the research process, from giving helpful information to working together on an equal basis up to full control over the research process. Recommendations for the practice of participatory research are given: thinking about participation as early as possible; planning additional time and resources; explicit and clear agreement on rights and duties of patients and researchers.

Conclusion: A list of open questions needs to be addressed in the future: Influence of participation on the quality of research (results); Demanding participation vs. freedom of research; How to decide who should participate in a given project? What do participating patients need (resources, knowledge, advice etc.)? How to secure genuine (instead of merely formal) participation?

Keywords: Participatory rehabilitation research, participation, research, rehabilitation

[S-012]

Organisational Justice and work ability: Cross-sectional findings from the second German sociomedical panel of employees

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Objective: Epidemiological research on the psychosocial determinants of work ability has increasingly focused on the concept of organisational justice (OJ), especially the dimensions of procedural justice (PJ) and relational justice (RJ). However, overlaps with the effort-reward imbalance (ERI) model were criticised. We examined whether both models are empirically distinguishable, and whether both constructs complement each other in the prediction of work ability.

Materials-Methods: Cross-sectional data were used from the Second German Sociomedical Panel of Employees. For measuring PJ and RJ, the corresponding scales of the Organisational Justice Questionnaire (OJQ) were applied. Furthermore, the ERI Questionnaire (ERIQ) and the Work Ability Index (WAI) were administered. Confirmatory factor analyses were used to test the multidimensionality of the OJQ and the ERIQ. Multiple linear regression models were built to estimate the influence of both concepts on the WAI.

Results: The sample included 1080 persons with at least half-time employment (mean age: 50.9 years, SD 3.9; 46.1 % women). Six items from both constructs were deleted on the basis of modification indices. The final model fitted well ($\chi^2/df=834.875/223=3.744$; $p<0.001$; NFI=0.943; CFI=0.958; RMSEA=0.050). For regression analyses, modified scales were used. In addition to the effects of the effort scale ($\beta=-0.110$; $p<0.001$) and the reward scale ($\beta=0.262$; $p<0.001$), we also found PJ ($\beta=0.137$; $p<0.001$) and RJ ($\beta=0.103$; $p=0.005$) to be associated with the WAI (adj. $R^2=0.242$).

Conclusion: The dimensions of OJQ and ERIQ are distinguishable indicators of psychosocial stress and useful for complementing the explanation of work ability. Research on the relevance of psychosocial factors for work ability should consider organisational justice as an additional characteristic of the work situation.

Keywords: Work ability, organisational justice, effort reward imbalance

[S-013]

Evaluation of competencies of experts work in the field of employment rehabilitation

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Objective: For decades, employment of a disabled person has been considered a key indicator in measuring effectiveness of employment rehabilitation results. Development of modern concepts for definition of disability, employability and employment of disabled persons has provided possibilities for a more up-to-date and advanced model for definition of employment rehabilitation effectiveness. The research during the 1980's established that there was no direct link between the quality of employment rehabilitation and the number of disabled persons entering into employment, while the latter was significantly correlated to overall economic and social situation in a given country and to the system measures adopted to promote employment. There is a link, however, between the quality of carrying out vocational rehabilitation and increased quality of life of the service users, which in turn has a significant impact on their performance at work.

Materials-Methods: Numerous countries develop advanced models for evaluation of employment rehabilitation.

Results: Most of studies in the field of employment rehabilitation effectiveness, particularly those regarding the knowledge and competences of the rehabilitation counsellors, were carried out in the United States, but also Australia pays significant attention to this area. In Slovenia, the Vocational Rehabilitation and Employment of Disabled Persons Act defines the conditions related to the education of professionals involved with employment rehabilitation.

Conclusion: Do the competences of the experts involved in employment rehabilitation have an impact on higher employability of disabled persons? A related question is how to ensure a harmonised and comparable competence level among employment rehabilitation providers while establishing conditions for professional growth and development of professional competences for the persons working in this field, and finally, to provide for international comparability of professional work in the field of employment rehabilitation and conditions for its inclusion into the European Accreditation System.

Keywords: Employment rehabilitation, competencies, persons with disability

[S-014]

Implementation of the German guideline for work-related medical rehabilitation

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Objective: To investigate how German inpatient rehabilitation centres are implementing the newly developed guideline for work-related medical rehabilitation (WMR), which describes additional therapies that should be performed in patients with poor work ability.

Materials-Methods: Implementation of the WMR guideline was evaluated in chronic back pain patients (ICD-10: M50 to M54) at seven inpatient rehabilitation centres. The patients completed the questionnaires at the beginning of the rehabilitation, at discharge and three months after discharge. Details regarding the treatments provided were extracted from the standardised discharge report.

Results: Of the 375 patients (mean age: 50.0 years, 55.5 % women) surveyed at baseline, 327 (87.2 %) completed the questionnaires at discharge and 267 (71.2 %) three months after discharge. The patients stated that work ability and work-related themes were a central component of their rehabilitation. Rehabilitation programmes comprised 82.9 hours of therapy on average; 11.2 hours (13.5 %) had specific work-related contents. The recommended frequency and duration of social counselling and work-related psychosocial therapy measures were appropriate. However, there were discrepancies regarding the recommended duration and frequency of functional capacity training. The standardised mean difference (SMD) between baseline and follow-up sick leave duration indicated an almost medium-sized effect (SMD=0.47; 95 % CI: 0.28 to 0.66). Effects on SF-36 pain (SMD=0.78; 95 % CI: 0.61 to 0.94) and SF-36 physical role (SMD=0.71; 95 % CI: 0.48 to 0.94) were almost large. Linear regression showed that additional 5 hours of work-related therapies were associated with a 1.2-week decrease in sick leave duration three months after discharge (95 % CI: 2.38 to 0.03-week decrease).

Conclusion: The WMR guideline was mainly successfully implemented. This seems to improve rehabilitation outcomes.

Keywords: Work-related medical rehabilitation, back pain, guideline implementation

[S-016]

Manipulation of regional cortical arousal by eeg-biofeedback in unilateral spatial neglect: In search of an explanatory model

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Objective: Unilateral spatial neglect (USN) is a frequent disorder following stroke, in which events occurring in the contralateral space fail to attract attention. Despite its major impact on functional outcome of stroke patients, most rehabilitation strategies proposed for this condition fail to show unanimous benefit in terms of reduced USN-related disability. EEG-biofeedback, termed also neurofeedback (NF), is a non-invasive method used to manipulate the level of arousal in a desired cortical region. We extended earlier research on NF role in USN-rehabilitation, aiming to obtain a better understanding of the relationship between NF-related fluctuations in cortical arousal and immediately following changes in spatial attention.

Materials-Methods: NF was applied with the right-parietal electrode P4 serving as the rewarding electrode. Reward was given upon increment in the beta/theta-ratio in that site. Hit rate (HR) and reaction time (RT) to stimuli were measured before and after each of 10 NF-sessions in consecutive days, all performed under EEG-monitoring. In selected cases we also used the Lateralized Attention Network Test (LANT) to examine effects on different aspects (alerting, orienting, conflict-resolution) of attention.

Results: Excessive low-frequency power signalling low cortical arousal was observed before treatment over the damaged right hemisphere. Physiological and behavioural responses to treatment varied within subjects (in different sessions) and between subjects. After the 10 sessions most patients reduced their RT and/or increased their HR to left-sided stimuli.

Conclusion: Stroke patients can modulate cortical arousal by NF. Given the multi-factorial nature of USN, variance in underlying mechanisms is assumed to be reflected in different levels of benefit. The use of behavioural profiling, coupled with portrayal of EEG-patterns at rest and in response to treatment, is expected to help defining the characteristics of the USN patients who are most likely to benefit from NF, so that future treatment selection can be based on structured predictions.

Keywords: EEG-Biofeedback, unilateral spatial neglect, spatial attention, stroke

[S-015]

An Online continuing education opportunity for rehabilitation practitioners globally

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Disability and community based rehabilitation (CBR) practitioners internationally have very few continuing education opportunities that are affordable, accessible and flexible. To address this need the International Centre for the Advancement of Community Based Rehabilitation (ICACBR), in collaboration with the Office of Interprofessional Education and Practice (OIEPE) and School of Rehabilitation Therapy (SRT) at the Faculty of Health Sciences, Queen's University, offers an online continuing education certificate program to international development practitioners in the rehabilitation and disability sectors. This modular non-credit program provides an opportunity for working professionals to explore the relationship between disability and CBR within the overall development context. It also builds learners' management, leadership, policy analysis, research and evaluation skills.

Initial learners' evaluation of the program revealed that overall the learners reported that they were satisfied with the program, they found the topics interesting and relevant to their practice, and that the program was well organised. They were also highly satisfied with the Moodle platform and the level of interaction and responsiveness of facilitators.

Although assessing the learning outcomes was not the purpose of this evaluation, the learners reported that they felt more competent in this subject area after taking the course and feel that they could be stronger advocates for disability and CBR. The learners were very motivated and engaged in the learning opportunities and had many opportunities to interact with each other in the virtual environment.

All recommendations made by learners were taken into consideration and changes implemented immediately. Technical support was provided within the shortest time possible. Number of readings, assignments, and timelines were reassessed and revised for subsequent offerings of the program.

Keywords: Online continuing education, community based rehabilitation, disability

[S-017]

One plus one may be more than two: Enhancing effects of bimanual motor timing and their implications for rehabilitation

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Objective: The goal of this study was to assess what rules the brain obeys when timing finger tapping performances of the dominant and the non-dominant hand. An "averaging rule" was hypothesized where the preferred tempo of the dominant side should be faster than the preferred tempo of the non-dominant side, while simultaneous bimanual performance should be an average of both. Alternatively, it was hypothesized that the non-dominant side would enslave the other side, thus slowing down bilateral performance.

Materials-Methods: A between-subjects design was used where participants (12 in the first and 12 in the second experiment) carried out a tapping task with the index finger until completing at least 30 continuous taps at the preferred tempo with the finger of the dominant hand and with the non-dominant hand (in counterbalanced order). The participants were then required to perform the tapping task with both index fingers at the same time at their preferred tempo. A PC keyboard was used for the experimental task and custom-made software written in MatLab (ver.7.13, MathWorks Inc., Natick, MA, USA) was used to collect the timing data for offline analyses.

Results: In the first experiment, finger tapping performance with the dominant hand resulted in a significantly shorter inter-tapping interval (mean 293 ms, SD 122) than performance with the non-dominant hand (mean 316 ms, SD 151). Surprisingly, bilateral tapping performance did not result in an average of the dominant and non-dominant sides (approximately 305 ms; i.e., 3.279 Hz) and instead resulted in significantly shorter intervals (mean 265 ms, SD 112; $p < 0.05$). This enhancing effect of the dominant over the non-dominant side was confirmed independently in the second experiment that produced further interesting effects.

Conclusions: These preliminary findings confirm that bimanual training may have enhancing effects on performance, particularly in patients where timing of both, the affected and unaffected sides together may result in a more intense rehabilitation (i.e., a sum up effect) than training each side separately.

Keywords: Tapping task, timing, bimanual tasks, motor enhancement effects

[S-018]

Long-term rehabilitation after global cerebral hypoxia

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Objective: Cardiac arrest and resuscitation are sometimes connected with global hypoxic ischemic injury of the brain. Many patients after global cerebral hypoxia are severely disabled even after intensive neurorehabilitation. Our department provides a day treatment program for patients after brain injury and because the results of the patients after global cerebral hypoxia were very poor in this program, we tried to reveal more details about their rehabilitation.

Materials-Methods: A group of 24 patients (9 women) after global cerebral hypoxia participated in our outpatient rehabilitation program lasting for 6 months. We tried to evaluate their functional status using the FIM (Functional Independence Measure) and the Meilli test of short-term memory at the beginning and at the end of the program. The results were statistically analysed. The correlations between age, the outcomes, time since injury and other factors were also studied.

Results: The results in both FIM and Meilli were significantly better after rehabilitation: average FIM item score increased from 5.32 (SD 1.31) to 5.81 (SD 1.06), and average Meilli score increased from 4.42 (SD 2.95) to 6.50 (SD 3.02).

Conclusion: Despite the improvement, the patients still had mostly cognitive problems after the program, preventing them from independent living. Our results are very similar to other studies and call for searching for new therapeutic strategies for people after global cerebral ischemia.

Keywords: Global cerebral hypoxia, neurorehabilitation, cognitive problems, FIM

[S-019]

Rehabilitation of walking and modified constraint-induced movement therapy of upper extremity in older patients with stroke

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Objective: The study examined the effectiveness of outpatient and inpatient rehabilitation programs on functioning, quality of life and sense of coherence in patients with stroke aged 65-85 years.

Materials-Methods: The duration of the outpatient and inpatient rehabilitation of walking WALK was 18/20 days. The duration of the modified constraint-induced movement therapy of upper extremity (mCIMT) was 13/14 days. A 6-day follow-up was performed at 6 months, and a 2-day-follow-up at 12 months after the baseline period.

Results: WALK (n=152) and mCIMT (n=120) participants were 72 (SD 5) years old on average, and started rehabilitation on average 13 (IQR 8-21) and 10 (IQR 7-18) months post-stroke, respectively. The participants selected for outpatient WALK (n=37) had better walking ability compared to inpatient WALK participants (n=115; p<0.01). Participants selected to outpatient mCIMT (n=26) had better functioning of upper extremity compared to inpatient mCIMT participants (n=94; p<0.001). Inpatient WALK participants' perceived functioning was better at 6 months (p<0.01), and walking ability both at 6 and 12 months (p<0.05 and p<0.01) compared to baseline. Walking speed of outpatient WALK participants had improved (10-meter-walk-test, p<0.05) whereas in inpatient participants it deteriorated (p<0.05) at 6 months, but neither form of rehabilitation showed differences at 12 months compared to baseline. Walking distance increased in both groups (6-minute-walk-test, p<0.05), but there were no differences at 12 months compared to baseline. Both mCIMT groups experienced improvements in ADL at 6 months (p<0.05 for outpatients, p<0.01 for inpatients) and in functioning of upper extremity at both follow-ups (outpatients: p<0.05 and p<0.01; inpatients: p<0.001 and p<0.001). Either WALK or mCIMT had no effect on the health-related quality of life or depression, but the sense of coherence improved in inpatient WALK participants at 12 months compared with baseline (p<0.05).

Conclusions: Intensive walking rehabilitation improved walking ability and sense of coherence in inpatient WALK participants. mCIMT improved upper extremity functioning both in the inpatient and the outpatient group. Intensive rehabilitation is important to support independency and mobility of older stroke patients.

Keywords: Stroke, older people, rehabilitation, walking training, constraint-induced movement therapy

[S-020]

The effects of erythropoietin on motor and cognitive functions following experimental stroke in adult rats

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Objective: The aim of this study was to investigate new procedures to enhance brain reparation and regeneration after focal ischemic injury (ischemic stroke).

Materials-Methods: Three-month-old (at the beginning of the study) male albino Wistar rats were used as subjects in this study. Endothelin-1 (ET-1) was delivered to the cortical area of a. cerebri media of all subjects. This procedure induced focal ischemia leading to neural injury accompanied by motor and cognitive defects. The subjects were divided into two groups: the experimental group was injected with erythropoietin (EPO), while the control group received saline. Motor and cognitive functions were assessed prior to, immediately after and at periodic intervals following the stroke. The motor functions that were assessed included spontaneous motor activity, provoked motor activity and changes in behavior and eating. The cognitive functions were assessed using a Morris water maze.

Results: The group of rats receiving EPO exhibited significantly better motor and cognitive responses following the stroke as well as better general status. Analyses of the chronic effects of EPO (5th, 12th and 19th day following stroke) showed that rats treated with EPO had statistically significantly higher behavioral scores than the rats that received only saline ($p < 0.05$ or $p < 0.01$).

Conclusion: The outcomes of this study could suggest that EPO could be used in the development of new treatment strategies for neural injury in human medicine.

Keywords: Experimental stroke, endothelin 1, erythropoietin

[S-021]

Effectiveness of an exercise program for osteoporosis on quality of life in women with osteoporosis

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Objective: The aim of our research was to examine the impact of an exercise program for osteoporosis on health and psychological aspects of patients with osteoporosis, and influence on the assessment of pain. A questionnaire was administered before and after the program, and BMI (body mass index) of the subjects was also considered.

Materials-Methods: The study included 39 subjects with osteoporosis. Participants were divided into two groups, patients with an ideal BMI (19.1-25.8), and patients with increased BMI (> 25.9). A program for osteoporosis lasting four weeks was conducted. It consisted of exercises for osteoporosis, advice about diet, advice on preventing falls, as well as of an interview and medical examination before and during the program. For self-assessment of health status, the generic SF -36 questionnaire was used. For the assessment of pain, a visual analog scale (VAS) was used.

Results: The results showed that there was a statistically significant improvement in self-reported quality of life in both groups. In the subjects with an ideal BMI an improvement was recorded in all dimensions; the improvement was the largest in the mental component summary (MCS). In the subjects with a BMI above the normal range, larger improvement in physical component summary (PCS) was recorded, while there was a deterioration of self-reported general health status compared to one year ago. The analysis of the VAS pain scale pointed out to a statistically significant reduction in pain following the program.

Conclusion: The results indicate that using short-term exercise and education of subjects significantly affects the psychological aspects of a patient's health, and therefore also self-assessment of quality of life. It also leads to a significant change in patient's perception of pain.

Keywords: Osteoporosis, quality of life, exercise

[S-024]

Impact of an educational health program on coping strategies and quality of life for family caregivers of cancer children receiving chemotherapy

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Objective: Cancer is a chronic illness that affects the entire family of the patient, and deteriorates the quality of life (QoL) of caregivers. Although family caregivers are the long-term care providers to children with cancer, they receive little preparation, information and support to perform this role. Therefore, it is deemed necessary that the health team should evaluate the psychological state of family caregivers and identify their psychological problems, and try to manage these problems to help them cope with the stressors in order to improve their QoL. The aim of the present study was to contribute to the improvement of the QoL of family caregivers of cancer children receiving chemotherapy through improving their coping strategies.

Materials-Methods: A quasi experimental design with pre-post assessment was utilized in this study with a sample size of 80 participants from family caregivers according to the inclusion criteria. The study was conducted at the Hematology and Oncology Units of the Pediatrics Departments in Zagazig University Hospital, and the pediatric cancer follow-up day care units. A questionnaire was used for collecting the data, comprising tools for assessment of parental coping, anxiety, depression, and QoL. The program consisted of 8 weekly sessions and a booklet.

Results: The results indicate that 72% of the participants spend 12-18 hours daily on care on average. However, the majority of family caregivers lack knowledge regarding cancer and chemotherapy side effects; they also have poor coping strategies, suffer from severe stress and depression, have strained relationships with other family members, all this having a negative impact on QoL.

Conclusion: The QoL is influenced by several factors such as family structure/interaction patterns, personal and family purpose and goals of life, functional abilities, social supports and availability of social networks, communication skills, activities of daily living, potential for adaptation and coping, cognition, economic resources, family beliefs, attitudes, values, and perceived stressors.

Keywords: Coping strategies, quality of life, family caregivers, cancer children, chemotherapy

[S-026]

The effect of breast prostheses on changes in semg paraspinal muscles in one-side postmastectomy women

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Objective: External breast prosthesis is an important part of improving the quality of life in post-mastectomy women. Improper selection causes posture disorders and back pain. We assessed the changes in erector spinae activity in women after mastectomy and the impact of different types of external breast prostheses on their activity.

Materials-Methods: 56 women after mastectomy aged between 38 and 70 years were included in the study at the Department of Rehabilitation in the Greater Poland Cancer Centre in Poznan. Patients with rheumatic diseases, trauma and spinal metastases were excluded from the study. Bioelectric activity of muscles of the spine was studied using MyoTrace 400 (Noraxon, US) in accordance with the guidelines of the SENIAM project. Prostheses of various weight were assessed using a functional test for the lumbar spine.

Results: During the months after mastectomy, an increasing difference between muscle activity on the right and left side of erector spinae was observed. The introduction of external breast prostheses caused symmetry in bioelectric activity of the muscles of the spine.

Conclusion: The use of breast prostheses for post-mastectomy women is an important factor in the improvement of static and kinematic body balance, which can significantly reduce the likelihood of postural disorders and back pain.

Keywords: Oncology, breast cancer, rehabilitation, body posture

[S-025]

Effect of physical exercise on the endurance tolerance and metabolic changes during androgen deprivation therapy and radiotherapy: A pilot randomized clinical study in prostate cancer patients

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Objective: Androgen deprivation therapy (ADT) and radiotherapy (RT) leads to a number of adverse effects including increased risk factors for cardiovascular and metabolic complications. The outcomes in our study were cardiorespiratory capacity and lipid control, while secondary outcomes included self-reported physical activity. The aim of our study was to evaluate endurance tolerance and impact of physical exercises on the selected clinical parameters in prostate cancer patients during ADT and RT.

Materials-Methods: This was a prospective study of 36 patients, between 51 and 75 years old, with prostate cancer during ADT and RT. The patients were randomly allocated in a 1:1 ratio to two groups. The intervention group received physical exercises 45 minutes per day. The control group performed physical activity on their own. The exercise tolerance was assessed through the 6-minute walk test (6MWT) and metabolic parameters in blood (HDL, LDL, cholesterol).

Results: In the intervention group in 6MWT, dyspnoea was significantly improved ($p=0.016$) compared to the controls, and the increased distance suggested an improvement in exercise capacity. The metabolic parameters in blood (total cholesterol: $p=0.02$, HDL: $p=0.03$, LDL: $p=0.03$) were significantly worse in the controls.

Conclusion: Regular physical exercise in prostate cancer patients during ADT and RT could improve capacity tolerance (with a substantial decline in dyspnoea) as well as lipid parameters compared to the patients without supervised physical activity. Further studies with larger sample size are necessary to confirm these results.

Keywords: Rehabilitation, oncology, metabolic disorders, physical activity

[S-027]

Role of physical activity in preventing disability in multiple sclerosis

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Objective: The role of physical activity in preventing disability in multiple sclerosis (MS) has so far not been described in European literature. It is well known that physical activity level in MS patients is lower than in the general population. It is higher in patients with primary progressive (Primary Progressive Multiple Sclerosis - PPMS) than in relapsing-release form (Relapsing remitting Multiple Sclerosis - RRMS) of the disease.

Materials-Methods: Numerous scientific studies have confirmed a low physical activity of people with MS. Most of them used accelerometry, pedometry and questionnaires; the most widespread of the latter are the Godin Leisure-Time Exercise Questionnaire - GLTEQ and the International Physical Activity Questionnaire - IPAQ.

Results: It has been found that behavioural methods lead to increased physical activity in patients. Improving physical activity delays the development of physical disability in multiple sclerosis patients and has the effect of increasing quality of life.

Conclusion: In a review, the most important trials regarding the role of physical activity in preventing disability in MS will be described. The majority of the studies come from Prof Robert Motl's team from the Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, USA.

Keywords: Multiple sclerosis, physical activity, disability, quality of life

[S-028]

Changes in the perceived tasks of daily life among persons with multiple sclerosis during a two-year multi-professional, group-based out-patient rehabilitation period

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Objective: To compare changes in performance on perceived tasks of daily life between moderately and severely disabled persons with multiple sclerosis (MS) during a two-year, group-based multi-professional out-patient rehabilitation period, and to find out by interviewing how these changes were explained by the attendees.

Materials-Methods: Eighty persons with MS (mean age 47.6 years; women 68 %; Extended Disability Status Scale [EDSS] mean 5.6) were assessed before, in the middle of, and after rehabilitation of 24 months using a client-centered Canadian Occupational Performance Measure (COPM). Outcomes within and between a group of persons with moderate disability (EDSS 4-5.5; n=38) and a group with severe disability (EDSS 6-8.5; n=41), were analyzed. Subjective explanations for the improvement in performing tasks of daily life were explored using semi-structured interview. Qualitative data were analyzed using content analysis.

Results: Both groups improved statistically significantly in COPM performance and satisfaction during the rehabilitation. There were no significant differences in improvement between the two groups. The reasons for improvement reported by the patients could be linked to the ICF classification: Environmental Factors (42 %), Personal Factors (37 %), Body Functions (11 %) and Activities and Participation (10 %). The most common reasons were learning to do daily tasks in a new way and to utilize new devices, compensations or services.

Conclusion: The two-year multi-professional, group-based out-patient rehabilitation improved the performance of persons with MS in perceived tasks of daily life. Self-reported explanations of the patients for improvement were diverse.

Keywords: Multiple sclerosis, group-based rehabilitation, canadian occupational performance measure

[S-030]

Beneficial components of rehabilitation from the perspective of persons with multiple sclerosis

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Objective: Clients' subjective experiences of rehabilitation provide information about important components of rehabilitation. The aim of this study was to gain an understanding of what persons with multiple sclerosis (MS) find beneficial in rehabilitation.

Materials-Methods: Persons with MS participating in a two-year multi-professional group based rehabilitation were interviewed in 16 focus groups (n=69) during the first half of the rehabilitation and individually (n=80) at the end of the rehabilitation. Discussions in the focus groups dealt with both their present and past experiences of rehabilitation. Participants were asked to report which aspects of rehabilitation they found particularly helpful in their own lives. In the individual interviews the participants were asked, to name up to five benefits (from a set list) that they gained from the multi-professional group-based rehabilitation.

Results: Experiences on the beneficial components of rehabilitation were diverse. However, in both data collections peer support was described as the most beneficial factor of rehabilitation. Other commonly experienced benefits were receiving new information and ideas on coping with everyday life, encouragement (mental support) and assistive devices and home adaptations.

Conclusion: The findings indicate that the importance of peer support should be taken into account in the rehabilitation of persons with MS.

Keywords: Multiple sclerosis, Client perspective, Rehabilitation

[S-029]

The prevalence of sexual dysfunction and its related features in Turkish multiple sclerosis patients

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Objective: In this controlled study, we aimed to assess the frequency of sexual dysfunction (SD) in patients with multiple sclerosis (MS) and to investigate the relationships of SD with clinical and demographic factors.

Materials-Methods: We enrolled 116 sexually active people in our study. The MS group consisted of 67 patients, 39 females and 28 males, and the control group was composed of 49 age-matched, healthy persons (28 females and 21 males). The demographic and clinical characteristics of the participants were also studied. We applied the Female Sexual Function Index (FSFI) for women and the International Index of Erectile Function (IIEF-5) questionnaire for men. Disability was evaluated with the Expanded Disability Status Scale (EDSS).

Results: The prevalence of SD in patients with MS was found to be 73.1%. This was significantly higher than in the control group (24.5%, p<0.001). Men (68.3%) also reported SD more than women (47.9%, p<0.001). There were no statistically significant relationship between EDSS and SD.

Conclusion: Sexual dysfunction is a common clinical problem for MS patients, though it is not related to disability. Men reported more SD than women. Considering the multifactorial nature of sexual dysfunction, further studies are needed to better understand the pathophysiology of these findings.

Keywords: Sexual, dysfunction, multiple sclerosis

[S-031]

Rehabilitation of guillain-barre syndrome patients

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Objective: Guillain-Barre syndrome is an acute demyelinating polyradiculoneuritis which can cause severe motor deficits (symmetrical ascending paralysis), autonomic dysfunction and respiratory failure. Although the prognosis in patients surviving the acute stage is relatively good, impairments of body structures and functions may persist, with consequent activity limitations. Comprehensive rehabilitation is therefore often required. The aim of our study was to assess rehabilitation outcome in these patients.

Materials-Methods: Fifty-five patients with Guillain-Barre syndrome, aged 58.8 years on average (SD 16.9, range 19-83 years) were included in the study. Manual muscle testing was used for assessment of limb function. Activity was assessed using the Functional Independence Measure (FIM) and two walking tests (6-minute and 10-metre). In addition to these measures, an adapted version of the ICF Checklist was applied. Assessment was performed at admission and at discharge.

Results: The rehabilitation lasted for 6-8 weeks on average (mean 49 days, median 39 days, range 16-156 days). Clinically important and statistically significant improvements were achieved regarding all the measures (p<0.001). High and statistically significant correlations were observed between the measures (p<0.01). There was no simple relation between improvement in body functions during rehabilitation and the duration of rehabilitation.

Conclusion: Clinically important and statistically significant improvements regarding body functions and activities were achieved in Guillain-Barre syndrome patients during relatively short inpatient rehabilitation.

Keywords: Guillain-Barre syndrome, acute polyradiculoneuritis, rehabilitation

[S-032]

A combined planning and telephone aftercare intervention for obese rehabilitation patients: Effects on physical activity and body weight after one year

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Objective: Obese patients require sustained life-style changes to reduce their health risks. We therefore developed a combined planning and telephone aftercare intervention to enhance physical activity after inpatient rehabilitation for obesity.

Materials-Methods: A prospective, randomized, controlled study was performed. A total of 467 obesity rehabilitation patients (55% male; mean age 48 years) were randomized to receive standard obesity rehabilitation or standard obesity rehabilitation plus the new intervention. Participants in the intervention condition planned individual physical activities they intended to perform after discharge and were followed up by 6 phone calls for 6 months. Physical activity and body weight were assessed after 6 and 12 months.

Results: The intervention was well accepted by participants. After 12 months, significant effects on physical activity duration ($p=0.012$) and energy expenditure ($p=0.008$) were found. At this point, the duration of physical activity per week was 58 minutes longer in the intervention group than in the control group. Path analysis suggested that the effect of the intervention on physical activity was partially mediated by self-regulation strategies addressed by the intervention including action planning and self-efficacy. At 6 months, but not at 12 months, a gender effect was found, with males benefiting more than females did. However, body weight was reduced to similar degrees in both study groups, with no difference evident between the intervention and control condition.

Conclusion: The additional intervention increased physical activity, but did not reduce body weight, compared with standard care. However, even without weight reduction, an increase in physical activity may reduce health risks in obese patients.

Keywords: Planning intervention, telephone aftercare, obesity, physical activity, body weight

[S-035]

Predictors of exercise capacity in patients after an acute coronary syndrome

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Objective: Patients who had suffered an acute coronary syndrome (ACS) are mostly physical inactive and consecutively have a decreased exercise capacity. To enhance physical activity is a core component of a comprehensive rehabilitation program. The aim of our study was to investigate predictors of exercise capacity (EC) to optimize the rehabilitation process.

Materials-Methods: From 2007 to 2010, 47286 patients (mean age 64 years, SD 11.2, 74.5% male) were referred to inpatient rehabilitation and were entered in the Transparency Registry to Objectify Guidelines-Oriented Risk Factor Management (TROL), a nationwide observational registry. All patients underwent a symptom limited bicycle stress test at admission (t1) and at discharge from the 3-week rehabilitation (t2). The dependent variable for the univariate analysis and the multiple logistic regression model was maximal exercise capacity. Comorbidities (diabetes, COPD, POD) and self-reported physical activity (more than 90 min./week) were also analyzed.

Results: The mean increase of EC during inpatient cardiac rehabilitation was 16.8% (t1: mean 85,6 W, t2: M=100,0 W, $p<0.01$). While male gender (OR 1.62 [95% CI: 1.51-1.74]) and physical activity before rehabilitation (OR 1.85 [95% CI: 1.75-1.97]) were positive predictors for enhancing EC by at least 15 W, comorbidities like COPD (OR 0.83 [95% CI: 0.75-0.92]), diabetes (OR 0.91 [95% CI: 0.85-0.97]) and POD (OR 0.80 [95% CI: 0.72-0.89]) as well as age > 75 (OR 0.82 [95% CI: 0.74-0.90]) were negative predictors.

Conclusion: Exercise capacity could be enhanced during 3 weeks of inpatient rehabilitation in patients after ACS, especially in men and physically active patients. Because patients with comorbidities and /or other end organ damage did not benefit in this short timeframe, special aftercare programs are warranted to increase exercise capacity sufficiently.

Keywords: Inpatient cardiac rehabilitation, exercise capacity, coronary artery disease

[S-033]

Disabling obesity: From determinants of disability to care models

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Obesity is a clinical condition characterised by significant clinical implications, such as co-morbidities and somatic fragility, which seriously affect independence, psychological well-being and overall quality of life. Given the figures of obesity world wide, there is a need to develop a proper rehabilitative approach originating from the functional limitation, disability and clinical needs of obese patients. Excess weight per se imposes abnormal mechanics on body movements, which could account for the high incidence of musculoskeletal disorders in these subjects.

Pain and osteoarthritis, both known determinants of disability, are often correlates of obesity, in particular at knee, hip and spine level, which shows a limited flexibility and increased dorsal stiffness. Despite greater muscle mass, when normalized to body weight, strength appears to be 10% lower in obese subjects as compared to their lean counterparts. Obesity appears to be linked to an increased risk of falling. As for cardiovascular response, obese subjects show a lower oxygen consumption in relation to body mass and perform early anaerobic work during exercise. Obese subjects basically adapt their gait and select lower walking speed so as to reduce the load at knee level and the metabolic expenditure. Cutting-edge research on the physiological determinants of functional limitation in obesity will be presented and the biomechanics of basic activities in obesity will be described.

Disability associated with obesity may be predominantly due to a combination of motor or cardio-respiratory complications according to the coexistence of a range of related conditions. The lecture will also discuss feasible care models for disabling obesity, illustrating current protocols in musculoskeletal, cardio-respiratory and psychological rehabilitation. This will explain what can be done rehabilitation wise based on the latest scientific evidences. Being obesity a burden for all national health services, an evidence-based discussion on effective care models appears a hot topic in rehabilitation.

Keywords: Obesity, disability, rehabilitation

[S-036]

Early outpatient rehabilitation following lung transplantation

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Objective: To set up an early outpatient rehabilitation program following lung transplantation (LuTX) with limited sources for supervised training.

Materials-Methods: In the past 1.5 year, a total of 20 consecutive non-Austrian, not-German speaking patients, who underwent single (n=2) or double LuTX (n=18) at the department of thoracic surgery and who were not eligible for inpatient rehabilitation participated in an outpatient rehabilitation program. The program consisted of 2 to 3 weekly 30-minute sessions of supervised therapeutic and breathing exercises, regular psychological and diet consultations. The patients were encouraged to perform daily muscle training and breathing exercises themselves. The main outcome measures were vital capacity (VC%), forced expiratory volume in 1 second (FEV1%), 6 minutes walking test (6MWT), fatigue at the end of the 6MWT (10 cm VAS), handgrip strength, and number of repetitions of a free chair rise test.

Results: The subjects (mean age 39 years, SD 13; mean BMI 20.6 kg/m², SD 1.8) started with outpatient rehabilitation on average 33 (SD 32) days after LuTX; it lasted for 64.7 days on average (SD 14). Among the lung function variables, VC% significantly improved from an average 44% (SD 9.7%) to 61% (SD 9.9%) and FEV1% improved from an average 48% (SD 10%) to 65% (SD 13%), respectively. The 6MWT (baseline: 402 m, SD 113) improved by 172 m on average (95% CI: 134 to 211 m), and fatigue at the end of the 6MWT (baseline: 7.4 cm, SD 1.4) decreased by 1.7 cm (95% CI: -0.7 to -2.9 cm) at the end of the program. Both the hand grip strength and the number of repetitions of the chair rise test were also found improved at the end of the intervention.

Conclusion: LuTX patients undergoing an early outpatient rehabilitation program that is limited by the availability of frequent supervised training benefit from such intervention. Perceived gains in functional performance seem comparable to those observed in early inpatient programs. Regular encouragement to optimize patients' adherence with unsupervised training is of utmost importance for the success of the program.

Keywords: Lung transplantation, rehabilitation, training

[S-037]

Cognitive, emotional and relational aspects associated to prosthesis adjustment in lower-limb amputation

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Objective: The aim of this study was to investigate the relationship between a satisfying adjustment to prosthesis and subjects' coping/reaction modalities in terms of cognitive, emotional and relational aspects in order to determine the most important psychological components to be addressed in a rehabilitation programme. The participants were a group of lower-limb amputees who had been wearing a prosthesis for at least one year.

Materials-Methods: The subjects underwent a semi-structured interview and filled in 7 questionnaires investigating the cognitive, emotional and relational dimensions associated to prosthesis adjustment. Independent samples t-tests were carried out in order to investigate the differences in mean scores between groups (prosthesis-use vs. no prosthesis use).

Results: The data demonstrated that a satisfactory level of perceived emotional well-being together with effective problem-centred coping strategies and a large degree of social involvement may be predictive of an adequate prosthesis adjustment.

Conclusion: The present study could allow for the development of an effective psychological intervention, focussing on those dimensions that prevent an adequate adjustment to a prosthesis in terms of psychological, emotional and physical identity integration. Furthermore, the study highlights the relevance and need for more research into prosthesis adjustment in order to determine an appropriate model of treatment to be implemented by all the clinicians in charge of the rehabilitation process and, more importantly, to define the focus of an adequate psychological intervention aimed at the amputee.

Keywords: Lower-limb amputation, body image and body schemata, adjustment to prosthesis, psychology of amputees

[S-038]

Psychosocial difficulties of patients with stroke

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Objective: This study aimed to identify and describe the onset and evolution of psychosocial difficulties (PSDs) that stroke patients experience in their everyday life. PSDs are defined as impairments, activity limitations, participation restrictions and environmental factors.

Materials-Methods: 80 adult patients with stroke (ICD-10: I60; I61; I62; I63 and I64) were consecutively enrolled at the Neurological Institute Carlo Besta of Milan and interviewed using the EU Project PARADISE Protocol that allow to collect self-reported PSDs associated to brain disorders.

Results: Mean age of patients was 60 years, 44% were females and 78% were married; 59% had high-school education or higher. The mean duration of the disease was 4 years (SD 6.5); 40% of the participants rated their health as good or very good, 45% considered that their health condition had improved since the disease onset and 10% reported no changes in the evolution of the disease. The most frequently PSDs reported by stroke patients were related to cognitive functions (language 51%, memory 63%, concentration 50%, slowness 65%), motor functions (coordination 60%, balance 59%, strength 60%, walking activity 53%), emotional functions (anxiety 73%, depressive symptoms 71%, coping functions 58%), daily activities (62%), pain (51%), and restlessness (71%). The main determinants acting as moderate or strong environmental facilitators were identified: medicines (98%), other health treatments (e.g., rehabilitation) (86%), assistive devices (96%), family help (96%), and health professionals' assistance (97%). Finally, 50% of the participants reported poor social support and 74% reported that they felt to be a different person, seeing life in a different perspective after the acute event.

Conclusion: PSDs after stroke are varied and differ according to the severity of acute event, the time passed since the acute event, the localization of the brain damage and the environment in which people live. These differences should be taken into consideration for planning tailored and personalised rehabilitation programs.

Keywords: Stroke, psychosocial difficulties, determinants, environmental factors

[S-039]

Measuring efficacy of follow-up medical check-ups using the international classification of functioning, disability and health in stroke rehabilitation setting

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Objective: To determine how many of stroke patients 'problems represented in their functional profiles at discharge from a comprehensive inpatient rehabilitation programme in post-acute stroke rehabilitation setting are checked at the time-limited follow-up medical examination in an outpatient clinic several months after discharge.

Materials-Methods: Functional profiles of 20 stroke patients were assessed using the ICF Comprehensive Core Set for stroke at discharge from a rehabilitation hospital (DRH) and at the first follow-up medical examination in a rehabilitation hospital outpatient clinic (FRC) based on medical documentation provided by two PRM specialists. Descriptive analyses were performed to identify changes in ICF categories from DRH to FRC; Mann-Whitney test was performed to test the difference between the two PRM specialists.

Results: Mean time from DRH to FRC was 8.5 months (range 4-13); patients' mean age was 49 years (range 23-72). On average, 38 (range 31-47) ICF categories were applied at DRH and 22 (range 9-33) at FRC. The mean number of identical ICF categories applied at DRH and FRC was 18 (range 9-30). Changes were found in 4.5 (range 1-14) of them on average, mostly due to improvement in qualifiers; and 4 additional (range 0-10) categories were applied on average at FRC. The mean count of ICF categories at FRC identified by the PRM specialist no. 1 and the PRM specialist no. 2 was 24 out of 39 and 18 out of 37 ICF categories applied at DRH, respectively ($p=0.056$).

Conclusion: At the time-limited first follow-up medical examination of stroke patients, about three fifths of the ICF categories were identified of those applied at discharge from a rehabilitation hospital. To improve the clinical practice in time-limited conditions there is a need to develop a check list with which we could rapidly and adequately capture the functional profile of the patient.

Keywords: Stroke rehabilitation, ICF, comprehensive core set for stroke

[S-040]

ICF competences require an interactive learning process

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The ICF (International Classification of Functioning, Disability and Health) provides a conceptual framework and a meaningful tool for rehabilitation professionals. Even if clear evidence supports the application of ICF in variety of clinical settings, many professionals struggle with adopting it into their working routines. The presentation focuses on challenges and possibilities that professionals face when learning ICF during a post-graduate course. In addition, the presentation offers an overview of the Finnish education regarding the ICF within the scope of a national learning network as a framework to ICF competences.

The adult learning approaches call for developing strategies and environments that are based on both individual and collective learning. The ICF courses in Metropolia University of Applied Sciences have been organized in multi-professional groups, which stresses the basic nature of ICF being a common, not profession bound, framework for understanding health and disability. Reflective and collaborative approaches are applied in facilitating competence building as well as training in practice.

From an individual perspective, the ICF training is continuing professional development in which learning strategies change according to the phase of person's professional growth and nature of the work. There are three types of learning goals: the learner seeks for a general overview of the ICF, strives for practical understanding of the ICF, or aims for systematic use of the ICF for coding information.

The ICF training challenges the professional's thinking models in two ways: firstly, to understand the paradigm shift from disability and a linearly oriented approach towards a holistic and health oriented interactive framework; and secondly, to map the professional theories and tools into the ICF framework, which requires both theoretical reflection and practical use of the ICF. As a conclusion drawn from the experiences of the ICF courses, we strongly recommend learning the ICF under interactive supervision to assure the learning outcomes of ICF as a client-specific approach that gives understanding of the complexity of human functioning.

Keywords: ICF, post-graduate education, interactive learning

[S-041]

Who cares for the carers? - Experiences as informal stroke carers

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Objective: Rehabilitation resources are decreasing and formal elderly care at home has to be supplemented with informal care, particularly elderly spouses. Little is known about elderly carers' life situation even if stroke is most likely to affect persons aged over 75 years. The aim was to explore and learn from elderly women's experiences of caring for their spouse at home after stroke.

Materials-Methods: The qualitative focus group method was used. A total of 16 women (median age 74 years) who cared for their partners after stroke (median age 80 years) participated. All sessions were taped, transcribed verbatim and analysed by two researchers. Four focus groups discussions were performed that each lasted for up to two hours.

Results: The discussions in the focus groups resulted in one comprehensive theme: "Mastering an uncertain everyday life", including both uncertainty and unpredictability. Three sub-themes emerged: "Living with another man" where the carers discussed not only the marked change in their partner's personality, but also the loss of a life-companion and their mutual intellectual contact; "Fear of it happening again", comprising the carers' experiences of fear and confinement, of always being "on line" and trapped at home; "Ongoing negotiation", referring to the carers' struggling and negotiating not only with their partners, but also with themselves and formal care for time to themselves.

Conclusion: This study gave us an understanding of the uncertain and unpredictable everyday life as an elderly female carer to a partner after stroke. We have learned from these carers the importance of developing within the team of rehabilitation professionals an individually-tailored, timely and continuous support to elderly carers.

Keywords: Stroke, elderly women, carers, informal, qualitative

[S-044]

The concept of translational medicine in physical therapy and rehabilitation

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The aim of the study was to evaluate the possibilities of translational medicine approaches in physical and rehabilitation medicine (PRM).

Very limited practical use of the results of recent molecular genetic studies identified the need for transfer of basic scientific research results into innovation. Translational medicine offers a solution to this problem. There is a cycle of innovative basic, clinical and organizational development phases. The development of translational research in PRM is being implemented in three main areas.

The molecular genetic trend can be implemented in personalized PRM. We have identified the genetic, functional, metabolic and psychophysical determinants of efficiency of PRM for different patients. The concept of heterogeneity of PRM defines different primary mechanisms of reactions to medical physical factors, molecular, cellular and systemic mechanisms of therapeutic action of different modalities of physical factors.

The medical direction is implemented within the evidence-based physiotherapy. The small number of placebo-controlled investigations and the impossibility of conducting them for some methods define the mismatch between the demands of the standards of randomised controlled trials (CONSORT guidelines) and personalized physiotherapy. Overcoming this barrier is possible by expanding and simplifying the CONSORT guidelines for medical physical factors and a through variety of clinical recommendations.

Leading the organizational development direction in translational medicine increases the social and economic benefits of medical rehabilitation both by improving the outcomes and by lowering the costs. Economic feasibility of applying the physical methods and comparing the cost and effectiveness of competing technologies are the aims of physioeconomy. An adequate tool for evaluating effectiveness of medical rehabilitation is the International Classification of Functioning, Disability and Health (ICF).

A major part of translational research and development in PRM is to ensure the continuity of the process of innovation. The translational medicine motto "From bench to bedside" will determine the progress of PRM and will require decades to develop the necessary competencies among the molecular biologists and clinicians.

Keywords: physical and rehabilitation medicine, evidence based physiotherapy, translational medicine

[S-043]

Rehabilitation outcomes in neurological diseases: Family impact and coping as related factors

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Objective: The aim of the study was to investigate the factors that influence the attitude and the patient's participation in the neurological rehabilitation. The factors investigated were the emotional impact and acceptance of the event, the adaptation to the condition of the patient, the expectations with regard to the functional recovery, and the coping style.

Materials-Methods: The study aimed to explore these factors at the time of admission of the patient to the clinic (T0) and at a distance of 6 months after hospital discharge (T1). The sample consisted of 150 people enrolled among the relatives of the patients related to neurological rehabilitation for post-acute neurological diseases. The exclusion criteria were impairment of cognitive functions and occurrence of stressful events in the last 6 months. To each relative, a set of psychological instruments was administered that consisted of the Caregiver Reaction Assessment Scale, the Coping Inventory, the Expectation Scale, the Self-efficacy Scale and the Caregiver Strain Index. The patient's medical history and functional evaluation were also considered. On the basis of the collected data, those relatives whose individual characteristics were found to be hindering the rehabilitation process were referred for a psychological intervention. The data from both measurements (T0 and T1) were compared to obtain information on the changes occurring in the course of the rehabilitative interventions. At follow-up, the neuro-functional and psychological dimensions of the caregiver were investigated.

Results: Some psychological dimensions of the patient's family have a negative effect on the rehabilitation outcome and on the long-term maintenance of the achieved results. In this perspective, the psychological intervention aimed at correcting those psychological dimensions and thus to favour an increase in the efficacy of the rehabilitation and maintaining its results.

Conclusion: Selected clinical cases and preliminary results will be presented.

Keywords: Neurological diseases, rehabilitation outcome, caregiver, coping

[S-045]

The reliability of the functional capacity evaluation according to isernhagen: A systematic review

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Objective: Functional capacity evaluation (FCE) is of major relevance for the rehabilitative process. Isernhagen FCE consists of 29 tests that enable to evaluate a person's ability to perform work-related tasks. The quality of one single test depends on the reliability of its measurement. Therefore, we conducted a systematic literature review on inter-rater and intra-rater reliability of Isernhagen FCE.

Materials-Methods: We performed a systematic literature search on the reliability of Isernhagen FCE. From all included studies, we extracted specific measures of inter-rater and intra-rater reliability for each test. Kappa values (κ) \geq 0.60, percentages of agreement (poa) \geq 80 %, and intra-class correlations (ICC) \geq 0.75 were categorized acceptable, otherwise as non-acceptable. The extracted values were pooled for five performance categories, and results were judged as either consistent or inconsistent.

Results: We retrieved 5403 citations from our literature search. After eliminating duplicates and non-eligible references by applying the inclusion criteria, we included eight studies in the final analysis. For inter-rater reliability of the tests of strength and weight handling, 94% of the extracted values were rated as acceptable. For intra-rater reliability, 91% of the extracted values of the tests of strength and weight handling achieved an acceptable level. The tests of posture/mobility indicated an acceptable reliability level only in 66 % of the extracted values. For the tests of locomotion, only 56% of the extracted values were rated as acceptable. The values of the balance test were on the acceptable level.

Conclusion: Strength and weight handling tests as well as balance tests were found to be consistently reliable on an acceptable level. These tests can be used for evaluating a person's work ability. Since the tests of posture/mobility and locomotion yielded inconsistent results, further research is needed.

Keywords: Functional capacity evaluation, isernhagen, reliability

[S-046]

Development and testing of a patient questionnaire for use in quality assurance within the German social accident insurance

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Objective: In Germany, medical care and rehabilitation after occupational accidents is delivered under the German Social Accident Insurance (GSAI) system. Within this system, cases are managed by qualified consultants who are surgeons or orthopaedic specialists with particular expertise in occupational medicine. This study aimed to develop and test a new patient satisfaction and health status questionnaire for use in quality management in this particular sector of ambulatory medical care and rehabilitation.

Materials-Methods: The questionnaire was developed by a process comprising four phases. After a systematic literature search to identify existing questionnaires (Phase I), semi-structured interviews were conducted with 18 patients receiving ambulatory treatment after occupational injuries to identify special needs and perspectives of these patients (Phase II). Based on these steps, a comprehensive item pool was compiled and reviewed by an expert group consisting of accident insurance consultants and administrative specialists from the GSAI (Phase III). The 59-item pilot version of the patient satisfaction questionnaire was then tested in a group of patients (n=112) who returned to work after an occupational injury (Phase IV).

Results: Analysis of distributional properties of the questionnaire items (floor/ceiling effects, missing data) identified no relevant problems. A clear four-dimensional factor structure could be identified: satisfaction with 1) care provided by the physician, 2) organization of services, 3) facilities in the practice, and 4) specific aspects of care coordination. After reduction to 38 items, the estimates of reliability (Cronbach's alpha) were above 0.80 for all subscales.

Conclusion: The patient questionnaire developed and tested in this study is a feasible measure for quality assurance with excellent internal consistency and strong support for its factorial validity. It includes important aspects of the specific care provided by accident insurance consultants within the GSAI system.

Keywords: Patient satisfaction, questionnaire, quality assurance, German Social Accident Insurance

[S-048]

Assessing portuguese quality of life outcomes for persons with intellectual disability: Escala pessoal de resultados

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Objective: According to recent research, quality of life (QoL) is a popular outcome measure within intellectual disability (ID) field and understanding its application is useful for assessing services and establishing individual plans. The modern ecological framework has challenged Portuguese research and practice: there is still a tradition of using non-Portuguese standardized tools and the Portuguese policy towards disability is changing, focusing on QoL. Hence, it was necessary to develop a measure of QoL for persons with ID. Our goal was to study the psychometric properties of the Portuguese version of the Personal and Outcomes Scale – the Escala Pessoal de Resultados (EPR).

Materials-Methods: The process of translation, adaptation and validation followed the international guidelines. Special attention was given to cultural and linguistic adaptation. The first step in the process was the forward and backward translations of the original tool by native Portuguese and English speakers, respectively. The translations were discussed by an expert committee, which agreed on a pre-final version that was tested and retested. The sample included 160 institutionalized participants with ID (67 women) with intermittent or limited support needs. Their age ranged from 18 to 64 (mean 32 years). EPR was used through self-report and direct observation.

Results: Reliability and validity were assessed. The EPR performed well concerning internal consistency, test-retest reliability, content, construct and concurrent validity, thus being an interesting option to evaluate QoL.

Conclusion: EPR seems to provide useful information for person-centred planning (program services and support planning) for persons with ID, including both subjective/self-report and objective/direct observation ratings. Our findings show that EPR is a good measure of personal outcomes with this population. Future studies are needed to conduct a confirmatory factor analysis.

Keywords: Intellectual disability, quality of life, reliability, validity

[S-047]

Content validity of epr: The portuguese version of personal outcomes scale

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Objective: The degree to which a measurement instrument spans the domain of the construct's theoretical definition is known as content validity (CV). It can help to ensure construct validity and provide confidence about the instrument. Only a literature review is not enough to guarantee CV and its analysis/report is a well-established requirement in scientific research. Therefore, in the validation process of Escala Pessoal de Resultados (EPR), the Portuguese version of the Personal Outcomes Scales, our first goal was to analyse its CV.

Materials-Methods: A two-stage process for estimating EPR' content validity was conducted. The development stage was based on literature review within the same eight core domains of the original version. Two items were added: importance and personal satisfaction. The judgement stage was carried out by selecting a panel of ten experts to rate each item and focus group based on relevance, clarity, simplicity and ambiguity on a four-point rating scale (non-relevant to very relevant). Every item was rated.

Results: The data obtained from the expert committee were analyzed. Content Validity Index (CVI) was determined for each item, as well the CVI for the entire scale and its average. A minimum of 0.78 was used for this measure. The majority of results ranged from 0.78 to 1. The few values under 0.40 were found with the same expert. Cohen's Kappa (k) was also calculated: a moderate (k>0.40) agreement was found for the majority of experts and some were above 0.78. The findings supported revising some items and keeping the remaining of items.

Conclusion: Measuring and reporting CV is one of the first steps to accomplish in an instrument development and validation process. CV of EPR was established by an agreement analysis among the expert judges. The degree of agreement was good for all items. Further research on psychometric properties of EPR is being carried out.

Keywords: Intellectual disability, quality of life, evaluation, content validity

[S-049]

Catastrophizing mediates the effect of depression on pain intensity

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Objective: Depression is not only a frequent comorbid diagnosis in chronic pain, but is also known to influence the chronicity and intensity of pain in a negative way. Additionally, the maladaptive coping strategy of catastrophizing has been shown to correlate with depression as well as with chronic pain and disability. Taking Beck's Cognitive Theory into account, catastrophizing can be understood as a symptom of depression. The aim of our study was to analyse the mediating role of catastrophizing in the association of depression and pain.

Materials-Methods: We included patients with chronic musculoskeletal disorders at the beginning of their rehabilitation aftercare. Recruitment was conducted in eleven outpatient rehabilitation centres. Depression (PHQ-D), catastrophizing (CSQ-D), pain intensity and mental health (SF-36) were assessed. Sobel's test was used for mediator analyses in order to estimate the direct and indirect effect of depression/mental health (independent variable) on pain (dependent variable) when considering catastrophizing as the factor that mediates their association.

Results: 305 persons were included in our analyses (54.4% women; mean age 46.3 years, SD 10.4). Depression had a statistically significant influence on pain if catastrophizing was not considered as a mediator ($\beta=0.347$, $p<0.001$). Catastrophizing was also associated with pain ($\beta=0.368$; $p<0.001$). Mediator analyses showed that 70.5% of the effect of depression was mediated by catastrophizing. The direct effect of depression on pain was not statistically significant ($\beta=0.101$; $p=0.148$). The analysis of the association of mental health, catastrophizing and pain intensity resulted in similar findings.

Conclusion: Catastrophizing seems to mediate the association of depression and pain intensity in patients with chronic musculoskeletal disorders. However, longitudinal studies are needed to clarify the association of depression, catastrophizing and pain intensity.

Keywords: Pain, depression, catastrophizing

[S-050]

Heart rate variability training: A new treatment for improved coping with chronic pain

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Objective: To introduce and demonstrate the efficacy of heart rate variability (HRV) training for improved coping ability for patients with chronic low back pain.

Materials-Methods: Adult patients presenting with chronic low back pain to an outpatient chronic spine care clinic were selected into a treatment and a control group. All of them completed an initial Chronic Pain Acceptance Questionnaire (CPAQ). A second CPAQ was completed after the fourth one-hour HRV training session. The treatment group was educated on the health benefits and physiology of respiratory sinus arrhythmia breathing. Using HeartMath computer software and a simple earlobe heart rate sensor, the participants were instructed how to reduce beat-to-beat RR interval variability into a regular coherent rhythm by shifting their emotions. The treatment group was asked to practice regularly between sessions one week apart without any devices. The no-treatment control group completed a second CPAQ two months after the initial assessment.

Results: T-test was performed to assess CPAQ mean score changes for the treatment group (n=9) vs. the non-treatment control group (n=12). The treated females (n=5) showed a marginally significantly larger change in CPAQ score (p=0.07) than males (n=4). The trend would likely be more significant with a larger sample size and without one outlier male participant. The gender difference results could be related to openness to treatment, which was not measured.

Conclusion: Encouraging trends were seen in the HRV treatment group despite this pilot study's limitations and small sample size. HRV training has the potential to become the first treatment with discrete quantitative objective measures to improve emotional resilience for patients suffering from chronic pain. Further research is clearly warranted for this low-resource, no-risk treatment with the potential to empower chronic pain patients.

Keywords: Heart rate variability, chronic pain, low back pain, training

[S-052]

Do unemployment rates affect return to work after medical rehabilitation in Germany?

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Objective: In Germany, the public pension insurance supplies medical rehabilitation to diseased employees to prevent premature retirement. However, return to work is also influenced by patient-related variables (e.g., diagnosis and age), treatment variables and context factors (e.g., the labour market).

Materials-Methods: Anonymised routine data of the public pension insurance were combined with unemployment rates. These data included information on medical rehabilitation and social security contributions in the years 2003-2009 for 385,937 cases who had worked at least six months in the year before rehabilitation. Logistic regression models were used to predict return to work in the year after rehabilitation. They included a subset of 12 potentially relevant patient variables (age, gender, main diagnosis, job class, education, working capacity in hours per day with respect to the current job or on the general labour market, income before rehabilitation, in-patient vs. out-patient treatment etc.). All possible 4,096 variable subsets were combined with one of the 10 different indicators of the labour market. To identify the best of these models and obtain robust results, a full model selection was performed, requiring computation of 40.960 model variations. C-statistic and Akaike Information Criterion (AIC) were used to identify the best models.

Results: After rehabilitation, 68,186 (17.7%) of the patients earned less than 5% of their income before rehabilitation, so we can assume that they left the labour market. The best models were able to predict return to work for 81.2% of the cases correctly. Except for in-patient vs. out-patient treatment and gender, all patient variables proved to be statistically significant in all model variations. Labour market indicators from the 12-month period after rehabilitation were superior to those from the month of rehabilitation.

Conclusion: Unemployment rates do affect return to work and should be considered as a confounder when evaluating rehabilitation programs or comparing different treatment approaches.

Keywords: Return to work, labour market, unemployment, Germany

[S-051]

Pain syndromes and effects on rehabilitation results in hemiplegic patients

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Objective: To determine the properties and frequency of pain in hemiplegic patients and its effect on rehabilitation results in our inpatient rehabilitation unit.

Materials-Methods: A retrospectively investigation of records belonging to 156 patients rehabilitated between January 2010 and July 2012 was performed. Frequency, localisation and musculoskeletal or neuropathic origin of pain were assessed. Pre- and post-rehabilitation motor evaluation and success in activities of daily living were also considered. The scores were compared between the patients classified as with and without pain.

Results: Mean age was 64.3 (SD 12.4) years, there were 74 males (48%) and 81 females (52%). The mean duration of pain was 10.5 (range 0-84) months; 59 (37.8%) of the patients had hemorrhagic and 97 (62.2%) had ischemic-originated plegia. Lateralisation was right-sided in 116 (74.4%) and left-sided with 40 (25.6%) patients; 46 (29.5%) patients had complained about pain. The two groups (pain vs. no pain) did not statistically significantly differ regarding age, gender, plegic side and existing spasticity. Nociceptive pain ratio was 86.7%, central pain ratio was 13.3%. The pain was mostly localised to the shoulder joint (86.9%). Non-steroidal anti-inflammatory drugs, physical therapy modalities and interventions such as injections had been performed on the patients with pain. In accordance with the neuropathic pain evaluation results, the patients who had central pain received pregabalin or gabapentin treatment. Pre- and post-rehabilitation Brunnstrom motor evaluation and functional independence measurement (FIM) did not statistically significantly differ between the groups.

Conclusion: The group with pain did not have worse functional scores than the group without pain. We believe that this is due to physical therapy, injections and medication. Other studies support a negative effect of pain on stroke management, but our results show that pain control improves rehabilitation outcomes.

Keywords: Pain, stroke, functional evaluation

[S-053]

Usefulness of the Vrij Baan questionnaire in a vocational rehabilitation programme

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Objective: To explore the usefulness of the Vrij Baan questionnaire for identifying participants' empowerment needs, program planning and measuring outcomes of a vocational rehabilitation programme.

Materials-Methods: The Vrij Baan questionnaire is a self-assessment instrument, consisting of 60 items, describing 6 components of empowerment: competence, self-determination, meaning, impact, positive identity and group orientation. 23 participants answered the questionnaire at the beginning and after participation in a vocational rehabilitation programme. Differences between groups were tested using paired t-test, Mann-Whitney test and Kruskal-Wallis test. Internal consistency of the subscales was assessed using Chronbach's alpha coefficient.

Results: The findings pointed to changes in the empowerment of participants at the end of the rehabilitation program. For all the subscales the scores from the second measurement were higher than from the first on average; the difference was statistically significant for the subscales of meaning, impact and group orientation. No statistically significant differences were found between groups regarding gender, age, vocational rehabilitation outcome, its duration or type of disability. Statistically significant differences were found between participants with different level of education, particularly regarding the impact, positive identity and group orientation subscales. Participants with secondary or higher education felt more empowered at the end of vocational rehabilitation than those with lower education. Internal consistency of the subscales was satisfactory ($\alpha \geq 0.70$) except for group orientation.

Conclusion: Our results indicate that the Vrij Baan questionnaire can be effectively used for identifying needs and measuring changes in the level of empowerment of participants in vocational rehabilitation programmes. The results of the study and further use of the questionnaire can provide useful information for making existing vocational rehabilitation programmes more effective in empowering the participants.

Keywords: Empowerment, employment, outcome measurement

[S-054]

Career paths in persons with disabilities - A large scale survey from slovenia

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Objective: We wanted to explore the relationship between personal values, personality traits and career anchors among persons with disabilities. We also studied the associations of demographic characteristics, type of disability and (un)employment history with their career anchors.

Materials-Methods: The study included 243 users of vocational rehabilitation service. The quota sample was highly representative of the target population. Five standardised questionnaires were applied to assess career goals, barriers to employment, career anchors, personal values and personality traits (the Big Five Inventory). Multivariate statistical analyses were performed with the gathered data.

Results: The career anchor security/stability proved to be the most important, while the anchors of entrepreneurial creativity and managerial competence were the least important ($p < 0.001$; one-way repeated-measures ANOVA). The most expressed value was security/health ($p < 0.001$; one-way repeated-measures ANOVA). The majority of the participants (58%) expressed willingness to work in elementary occupations. Disability was identified as the main barrier to employment (highest mean scores on 5-point scale, all > 3). Canonical correlation analysis revealed a plausible pattern of correlations between personality traits and career anchors (openness to experience positively correlated with importance of the carer anchors dedication to a cause and pure challenge, $p < 0.001$; agreeableness negatively correlated with importance of autonomy/independence and entrepreneurial creativity, $p < 0.001$), as well as between values and career anchors (preference for existential values positively correlated with importance of the autonomy/independence, $p < 0.001$; preference for Dionysian values positively correlated with importance of the security/stability and negatively with importance of dedication to a cause, $p = 0.002$). Multinomial logistic regression identified gender ($p = 0.009$), marital status ($p = 0.004$) and having children ($p = 0.041$) as the main demographic factors associated with the profile of career anchors.

Conclusion: The findings highlight the importance of understanding values, personality traits and career anchors in the process of vocational counselling for persons with disabilities in addition to the commonly considered demographic factors and medical characteristics.

Keywords: Disability, unemployment, values, personality traits, career anchors

[S-055]

Workplace adaptations for persons with disabilities: Reasonable accommodation research in employment and rehabilitation for persons with disabilities

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Objective: To present the workplace adaptation study "Reasonable Accommodation Factor Research in Slovenia" in employment and rehabilitation for persons with disabilities, and to present the origins and definitions of workplace adaptations as a reasonable accommodation human right for persons with disabilities under the UN Convention on the Rights of Persons with Disabilities.

Materials-Methods: Exploratory factor analysis was conducted with principal axis factoring. The Slovenian research was designed on the basis of the original American study. In the piloting questionnaire we added some questions focused on different reasonable accommodation (workplace adaptations) possibilities and the barriers preventing the accommodation. The population surveyed were the professionals in Slovenia dealing with reasonable accommodation (workplace adaptation) in employment and vocational rehabilitation.

Results: Four hypotheses were tested. The results of the survey confirmed three out of four hypothesised factors that influence reasonable accommodation (workplace adaptations) possibilities for persons with disability. The most important factor was the attitude and support of employers in regard to reasonable accommodation. The second factor focused on the characteristics of employees with disabilities, and the third on the implementation of reasonable accommodation. A new and important fourth factor was the awareness of reasonable accommodation possibilities. The research on reasonable accommodation contents revealed two factors – common supported environment for employment of persons with disabilities and specific possibilities of work environment accommodation. The most widely recognised types of workplace adaptations were technical/technological solutions, architectural accessibility and organisational solutions.

Conclusion: The study indicated that employer's attitudes and support are the main factor in workplace adaptations. The most problematic barriers were found to be systemic questions – financial resources, long duration of procedures and knowledge of stakeholders within the process of reasonable accommodation. Raising awareness of reasonable accommodation/workplace adaptations is an important factor for persons with disabilities and as such it should be considered more in the future.

Keywords: Disability, workplace, employment, reasonable accommodation

[S-056]

“The team is the key!” – Multi-professional teamwork in work-related medical rehabilitation

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Objective: Work-related medical rehabilitation (WMR) is an effective rehabilitation strategy in German medical rehabilitation, focussing on persons with extensive work-related problems. The multimodal approach requires a close cooperation of a multi-professional rehabilitation team. The study explores the relevance of multi-professional teamwork in WMR.

Materials-Methods: To pursue this objective, a qualitative research approach was chosen. We conducted focus groups with WMR teams from seven orthopaedic rehabilitation centres. The focus groups were examined by qualitative content analysis.

Results: The teams described multi-professional teamwork as one factor for a successful WMR, referring to its relevance for the holistic treatment of the multifactorial impaired target group. Since conventional medical rehabilitation does not require multi-professional teamwork in the same extent and intensity, the implementation of a WMR program initiated a team building process. Even though all teams named similar indicators for effective multi-professional teamwork in WMR (i.e., flat hierarchies, shared language and knowledge, joint treatment goals and strategies, regular team meetings), these indicators were accomplished to a different degree in the daily routine of the seven teams. We found three team types: 1. Consultative Involvement, 2. Inclusive Participation, and 3. Joint Performance. These types were associated with different context factors (i.e., case numbers) and differed in three major aspects: 1. team members' chance to participate in managing the WMR process, 2. the way of providing the treatment, and 3. the communication practice. According to the current state of research, the team types correspond to common multi-, inter- and trans-disciplinary team models.

Conclusion: The study shows the outstanding relevance of multi-professional teamwork for WMR. The impact of team structures on WMR outcomes has to be examined in the future. To strengthen multi-professional teamwork, team building and organisational development programs should be carried out in WMR centres.

Keywords: Work-related medical rehabilitation, multi-professional teamwork, team types

[S-057]

Back to daily routine, who logged in? Utilization of an online aftercare program to improve vocational reintegration after inpatient medical rehabilitation

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Objective: Inpatient medical rehabilitation has increasingly targeted work stress as an important determinant of mental and somatic disorders and premature retirement. Aftercare programs are required to achieve sustainable treatment effects. Online aftercare programs indicate high patient satisfaction, acceptance and efficacy, but studies specifically related to medical rehabilitation are rare. In this paper, initial data considering utilization of an online aftercare program, aiming to improve vocational reintegration, are reported.

Materials-Methods: In an ongoing RCT vocationally strained patients (n=800) who are taking part in a stress management group training during inpatient rehabilitation are randomized to either the intervention (IG) or the control group (CG). After inpatient rehabilitation, the IG is offered weekly writing tasks and individual therapeutic feedback for 12 weeks. The CG obtains links to information about stress management. The primary outcome is a social medical risk score for premature retirement.

Results: The sample includes 623 patients so far, with 57% men and 43% women, 48 years old on average. Of the 302 IG patients, 78% logged into the platform at least once after rehabilitation and 83% of those wrote at least one blog (mean=6). Of the 321 CG patients, 67% logged into the platform at least once. Regarding the three indications and utilization, the orthopaedic patients (80%) are followed by psychosomatic (78%) and cardiovascular patients (65%). No statistically significant differences regarding login arise in gender, age and the risk score for premature retirement.

Conclusion: A high rate of patients visited the platform and made use of the blogs. Utilization differs regarding indication. Taking into account restraints with internet access in the two cardiovascular clinics, the lower utilization rate of these patients may not indicate a lower willingness to use online aftercare programs but a less practical preparation for the internet-based program during inpatient rehabilitation. Thus the results may underline the importance of interrelated programs and networking.

Keywords: Premature retirement, aftercare, stress, internet

[S-058]

The results of a mixed methods study evaluating a development project on work-related rehabilitation

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Objective: The Finnish Social Insurance Institution finances rehabilitation for employees with work-related health problems. A development project aimed to discover new practices in disability management to meet challenges of today's working life. Different programmes by five rehabilitation providers were piloted in field-tests comprising about 500 rehabilitees. Vocational rehabilitation in Finland is characterized by co-operation between occupational health (OH) providers and rehabilitation centres, by group-based in-patient rehabilitation interventions and by a multi-professional team approach. Compared to conventional models, the pilot programmes featured a closer linkage between the workplace, rehabilitation centre and OH providers. The pilot programmes were characterized by diversity in methods of co-operation, variation of the contents and length of in-patient periods, and development of net-based solutions. In developing their programmes, each service producer carried out 10 interventions (groups with 8-10 rehabilitees), with the last three interventions being implemented in a stabilized way.

Materials-Methods: The new ideas concerning working life connections in rehabilitation were in focus. Qualitative data were collected by means of focus group interviews with the actors of the process, and quantitative data by questionnaires. Theory- and data-driven analyses as well as statistical analyses were used. An important question was to which extent the knowledge from one specific setting can be used in other circumstances.

Results: Employees benefited from all the novel programmes in different ways. Promising ideas were identified by the research and these ideas provided the basis for designing a single new programme. Presently, five rehabilitation providers are piloting this programme in field-tests and another ongoing study is assessing its effectiveness.

Conclusion: Development of rehabilitation intervention is a phased process. From the research point of view, knowledge is often context-dependent at first and not until later universal and generalized. Different research methods and approaches are needed.

Keywords: Development project, work ability rehabilitation, mixed methods

[S-060]

Occupational therapists' views of a structured interview to identify and prioritise the work problems of people with rheumatoid arthritis

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Objective: The Work Experience Survey-Rheumatoid Conditions (WES-RC) is a structured interview identifying work barriers of people with arthritis. Developed in the USA, it takes about 45 minutes to complete. We are using it in work rehabilitation for an inflammatory arthritis feasibility study. We therefore explored participating occupational therapists' (OTs) views about conducting the WES-RC.

Materials-Methods: Nine OTs from 5 rheumatology out-patient departments were trained in WES-RC use in two case studies, role-playing one interview and then completing it with 2-3 patients each. Semi-structured interviews with OTs were conducted, recorded, transcribed and thematically analysed by three researchers to maximise validity.

Results: The main emerging themes were: the WES-RC was very effective for identifying, prioritising and helping solve patients' work problems; the lack of previous experience using any structured assessments; initial difficulty conducting these structured interviews as a result; and concerns about the feasibility of a lengthy interview in practice, as most were taking up to 1.5 hours. Most OTs considered the WES-RC an effective tool to identify and help solve the work problems of employed people with RA. However, lack of experience conducting structured interviews meant it was initially difficult to efficiently use it.

Conclusion: The WES-RC is a good choice of work assessment which can be implemented in practice. Rheumatology OTs need more training to increase their confidence and efficiency in its use. Our training programme needs increased practice and feedback to ensure the WES-RC is completed in under an hour, including identifying priorities and beginning treatment planning.

Keywords: Rheumatology, work-rehabilitation, OT, structured-interview, assessment

[S-059]

Female leaders' experiences of psychosocial working conditions, health and vocational rehabilitation in Swedish public human service organizations

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Objective: Municipal workplaces have high levels of sickness absence, and deterioration of the psychosocial work environment has been most pronounced for women and employees in this sector of Swedish working life. This study explores how female leaders in one rural municipality in Sweden experience their psychosocial working conditions, health and vocational rehabilitation measures.

Materials-Methods: In-depth interviews with twenty female leaders were carried out. The gathered data were analysed with content analysis using major dimensions of work stress models. These were job demands, job control, social support, job resources and health consequences.

Results: The analysis showed that the leaders experience high and conflicting job demands, limited possibilities to influence their work situation and insufficient job resources and social support. However, the leaders experience possibilities to develop skills in their jobs and opportunities to participate in educational programs. Several of the leaders have an earlier history of illness related to psychosocial factors, and they experience inadequate return-to-work measures after sickness absence periods. They also experience frustration over having limited time for their own health promotion efforts.

Conclusion: The study confirmed the need for improvements in the prerequisites for female leaders in public human service organizations. It is important to improve female leaders' psychosocial working conditions by implementing a more narrow control range, increased personal and economical resources, and leadership support and leader development programs. It is also important to develop strategies for workplace-based vocational rehabilitation measures and possibilities for employee's own health promotion efforts. The leaders seem to be conscious of the risks of ill health and what behaviours promote psychosocial health in the workplace, but lack the tools to transform this awareness into concrete action.

Keywords: Female leaders, psychosocial working conditions, health, vocational rehabilitation

[S-061]

Economic profitability of rehabilitation within the Finnish statutory earnings-related pension scheme

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The objective of vocational rehabilitation within the Finnish statutory earnings-related pension scheme is to support employees and self-employed persons in coping with their work, and thus to save pension expenditure and increase pension contribution income. The economic objective is that the total costs of rehabilitation would be smaller than the alternative pension expenditure. The income benefit paid for the rehabilitation period is determined on the basis of the person's earnings-related pension rights, and thus the saving in pension expenditure can be estimated.

A general observation of the rehabilitation programmes that terminated in 2002-2011 indicates that more than 60% "have been successful": people have returned to work. As for the economic profitability, the costs of rehabilitation are in a central position. The total costs for the scheme incurred by the people who completed their rehabilitation programmes in 2011 (4,600 persons) amounted to €64 million. When estimating the cost of succeeding, in an economic analysis, the expenses for "unsuccessful" rehabilitation programmes are also included in the costs. Calculated in this way, the average cost of a successful rehabilitation programme was 19,400 €/programme, and as the average disability pension expenditure was 12,100 €/year in 2011, the investment in successful rehabilitation programmes would pay itself off in less than two years.

In the pensions and employment registers of the Finnish Centre for Pensions, we monitored to what extent did the people who had completed their rehabilitation in 2008 (3,400 persons) remain at work up to the end of 2011, i.e., for more than three years. The registers show that people have kept working for the three-year period, and the goal has been reached: the investment in the rehabilitation programmes that terminated in 2008 has already yielded almost a double return.

Keywords: Vocational rehabilitation, economic profitability, return-to-work

[S-062]

Mini-invasive surgery and posterolateral access in total hip arthroplasty: Comparison of functional outcomes and efficacy in a group of patients admitted to rehabilitation

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Objective: Over the past years, the number of hip joint replacements has steadily increased. Even though international studies emphasize the importance of using universal and validated scales to measure rehabilitation program outcomes, there are still methodological limitations that lead to a lack of uniformity in the use of these instruments. The aim of our study was to evaluate (in terms of functional outcomes) the effectiveness of elective total hip arthroplasty (THA) for anterior compared with posterolateral access in a group of patients admitted to the Centro Ortopedico di Quadrante Hospital using several scales.

Materials-Methods: A sample of 44 THA patients was divided into two groups of 22 – one with anterior and one with posterolateral access. All the patients were assessed with validated functional scales (FIM, NRS, WOMAC, a measure of ROM and strength with MRC) at the admission, on the second day after surgery, at discharge, and after 6 months. Length of stay and the average consumption of bags for blood during transfusion were also analysed in both groups. Nonparametric statistical tests were used.

Results: There was no statistically significant difference regarding the effectiveness of the two surgical interventions for THA, except for FIM at discharge ($p=0.037$), which argued in favour of the posterolateral technique.

Conclusion: Our study did not show a statistically significant difference in the effectiveness of the two techniques for THA (except regarding FIM at discharge, which preferred the posterolateral approach). However, our study had notable limitations, especially small sample size and only partial randomization. The scales that were used to assess the patients appear to be adequate as suggested in the literature, transferable to other similar settings and offer valid support for managerial decisions.

Keywords: Hip arthroplasty, functional outcomes, surgical techniques, efficacy, rehabilitation

[S-063]

The impact of two implementation strategies for patient education programs on patient-oriented education practice in orthopedic rehabilitation

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Objective: The implementation of standardized patient education programs represents a challenge for routine clinical practice and is frequently not entirely successful. There is a lack of studies comparing implementation strategies within medical rehabilitation. Therefore, our project aimed at evaluating the effectiveness of two implementation strategies - train-the-trainer-seminar (TTT) and implementation guideline (GL) - for the dissemination of a patient-oriented back school with regard to a patient-oriented and manual-based education practice as well as patient satisfaction.

Materials-Methods: An implementation study in 10 rehabilitation clinics was conducted using a mixed-methods approach for process- and outcome evaluation. The clinics were randomly assigned to either the TTT or the GL intervention. Implementation outcomes were assessed 12 weeks after the intervention. Trainers and patients evaluated the education practice with standardized questionnaires directly after each back school module. Additionally, some modules were observed and rated with standardized records. Data were available for 36 patient education groups (i.e., 261 modules). The samples comprised 234 trainer ratings, 416 patient ratings, and 136 observations for single modules.

Results: Trainer ratings showed a significant group effect in overall trainer satisfaction with the back school. The trainers in the TTT condition, as compared to the trainers in the GL condition, showed higher satisfaction with training practice and reported significantly higher achievement of manual-based educational objectives. Moreover, patients in the TTT condition, as compared to the GL condition, showed significantly higher treatment satisfaction. Furthermore, they made significantly more positive than negative remarks with regard to patient-oriented educational aspects. The results of the observations regarding educational contents and didactics were heterogeneous; no systematic group differences were observed.

Conclusion: Trainer seminars/courses showed several benefits compared to an implementation guideline with regard to manual-based, patient-oriented education practice and patient satisfaction. Therefore, specific train-the-trainer-seminars should be encouraged in the context of the dissemination of patient education programs.

Keywords: Patient education, implementation strategies, evaluation, orthopaedic rehabilitation

[S-065]

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

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

Materials-Methods: The retrospective study included all the patients from 2008 to 2011 whom our department took over from the neurologic, traumatology, orthopaedic and internal medicine departments. The outcome measure was the FIM (Functional Independence Measure). The initial FIM was assessed within 72 hours after the patient's arrival, and the discharge FIM was assessed within the last 48 hours before discharge.

Results: The study included 1,295 patients: 396 orthopaedic patients with an average age of 74.8 years, a mean length of stay of 16.0 days and mean FIM progress from 101 to 115 points; 375 traumatology patients with an average age of 81.4 years, a mean length of stay of 18.8 days and mean FIM progress from 82 to 103 points; 363 neurological patients with an average age of 75.9 years, a mean length of stay of 21.1 days and a mean FIM progress from 73 to 91 points; and 161 cardiological/internal medicine patients with an average age of 80.2 years, a mean length of stay of 17.5 days and mean FIM progress from 81 to 96 points. The mean FIM progress of all patient groups was 1.24 (SD 0.16) points per therapeutic day. The recommended target value of the American Rehabilitation Counselling Association (ARCA) is 1 FIM point per therapeutic day.

Conclusion: It is possible to obtain a sufficient functional progress for all patients in stationary early geriatric rehabilitation independently of which specialist department they are admitted from.

Keywords: Early geriatric rehabilitation, functional outcome, FIM

[S-066]

The basis for gerontological group-based rehabilitation – Results of a study within the IKKU project

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Objective: The aim of the IKKU project (The Research and Development Project of Co-operative Rehabilitation for Aged Rehabilitees 2009–2013) of The Social Insurance Institution of Finland was to promote independent lifestyle of aged rehabilitees through group-based rehabilitation process. Six service providers, 18 municipalities involved in the project, and 367 rehabilitees participated (8 rehabilitees per group). One part of the project was to construct the basis of innovative gerontological rehabilitation.

Materials-Methods: The material was gathered through regular observations of selected rehabilitation courses in six rehabilitation units (for 101 days) and through progressive focus group discussions by the units' multi-professional teams (n=29). The observational data and focus groups formed a gradually widening collaboratively built synthesis binding rehabilitation and gerontological theories based on the current situation of gerontological rehabilitation as well as on the client's perspective.

Results: Innovative, person-oriented and group-based gerontological rehabilitation gradually developed throughout the project was based on three fundamental phenomena. First, processing of primary aging that took place in the group of rehabilitees and the experienced peer group support allowed new interpretation horizons of the secondary aging, thus strengthening the participants' confidence in the continuity of living at home. Second, the different ages (chronological, subjective, social and performance-related) overlapped, alternated, and consulted one another, thus forming a viewpoint that expands gerontological rehabilitation and designs the rehabilitation products and services in a more person-orientated manner. Third, through the study process four experienced and lived approaches of gerontological rehabilitation were constructed, which can be examined as restarted, reformed, innovative, and abandoned approaches.

Conclusion: Through the concepts and constructions cooperatively built within the study, gerontological rehabilitation can be developed and improved both as individual and group processes, but it can also be reformed to meet the needs of aged people in the future. This description of gerontological rehabilitation promotes innovative research and development activity.

Keywords: Gerontological rehabilitation, observation, focus-group discussion

[S-067]

Preliminary results of the validation process of the Portuguese version of the examen géronto-psychomoteur in Portugal

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Objective: The Examen Géronto-Psychomoteur (EGP) assesses psychomotor abilities of older people as a prerequisite of psychomotor therapy. The study purpose was to validate the EGP Portuguese version (P-EGP) for elderly populations.

Materials-Methods: The study design included validation and administration processes, following international guidelines including ethic approval and informed participant consent. A field-test with 99 participants (27 males, 72 females) aged 60 to 95 years (mean 78.9 years, SD 8.6) was conducted to ensure equivalence to the original. Data collection took place in 2012 on two different occasions for each subject within a 3-week interval. All items were administered according to the original protocol. Cognitive, functional and socioeconomic status was also evaluated.

Results: The results addressed reliability and validity. P-EGP performed well regarding internal consistency, test-retest reliability, content, construct and concurrent validity. The domains presented good internal consistency, except the verbal memory and perception domains. Cronbach's alpha for the total scale was 0.97. Statistically significant correlations between domains were observed. Intraclass correlations ranged from 0.66 (verbal memory) through 0.92 (dynamic balance I) to 0.97 (for the total scale). Discriminant validity results pointed out the differentiation between groups (with and without dementia). Convergent validity ranged from 0.20 to 0.82, indicating moderate to significant correlation between the items.

Conclusion: P-EGP appears to be an acceptable tool to use in the elderly persons with and without dementias. The results are consistent with the French study, but some questions need further research (e.g., confirmatory factor analysis and comparative studies). Standardization process will be the next step.

Keywords: Examen Géronto-Psychomoteur, psychomotor evaluation, psychomotor skills, aging, dementia

[S-068]

Physical activity in the older population: an interesting profile of the elderly in turkey

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Objective: The aims of this study were to evaluate the level of physical activity in the older population of Turkey in different regions and to investigate the relationship between physical activity and related barriers, such as demographic and anthropometric determinants, dietary habits, medical conditions, drug use and lifestyle.

Materials-Methods: This was a prospective, cross-sectional study performed in tertiary care hospital-based physical medicine and rehabilitation departments (13 departments from 7 cities), which was organised by the Geriatric Rehabilitation Study Group of the Turkish Society of Physical Medicine and Rehabilitation. Demographic and anthropometric determinants, dietary habits, medical conditions, drug use and lifestyle were assessed. Physical activity was assessed through the short version of the International Physical Activity Questionnaire (IPAQ), using hospital interviews with last-week recall and by a question on the regular practice of leisure-time physical activity. Based on the IPAQ score, participants were classified into three groups: high level of physical activity (n=102), moderate level activity (n=234) and lower level activity (n=99).

Results: A total of 497 participants (371 women) were involved in this study. Their mean age was 71.9 years (SD 6.0) and mean overall IPAQ score was 116.4 (SD 123.2, median 87). Between the IPAQ score groups, a statistically significant difference was observed regarding the prevalence of physical inactivity in women, traditional dressing style, and having at least one co-morbidity (such as hypertension, diabetes or COPD) (p<0.05). IPAQ scores decreased with age and higher body mass index (p<0.001).

Conclusion: Since physical inactivity is an important problem, the results of this study may help health professionals to understand and address the issues related to physical inactivity among older adults and to influence the related determinants.

Keywords: Geriatrics, IPAQ, physical activity, Turkey

[S-069]

Mutual tone. Development of music and linguistic-cognitive based Tablet PC assisted rehabilitation programs in dementia

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In connection with the population's rapid aging, the number of individuals with dementia is increasing in Europe. The development of new effective rehabilitation models is essential, particularly at the early stages of dementia. There is positive evidence on music-based interventions, which have been reported to be effective in enhancing cognitive functioning and emotional well-being of person's with dementia.

The aim of the project is to enhance the interaction and functioning in daily living for persons with dementia at its early stage. As the participants should live at home, the purpose is also to support the wellbeing of an immediate family member. The third aim is to develop a model in which mobile technology is used for rehabilitation purposes.

The project is funded by the Finland's Slot Machine Association and the Miina Sillanpää Foundation. The effectiveness of the technology assisted training programs developed in this project will be evaluated separately in research conducted by the Rehabilitation Foundation.

The rehabilitation model is designed for the rehabilitee and his/her family member. The intervention lasts six months, and it consists of individual and group guidance weekly by music or speech therapist. The participants use music or cognitive-linguistic based tablet-PC assisted rehabilitation programs in home training. They also have an individual plan for wellbeing developed and installed on the tablet PC. The video phone connection is used for guidance given by the therapist and contacting other participants as part of the intervention.

The preliminary experiences on the rehabilitation model have been positive. The participants have provided support, knowledge and help to each other, which has had positive effect on their coping in daily living. The wellbeing plan has structured routines and increased the number of daily activities. The participants have used the video phone together. The elderly people as end users call for user-friendly and reliable technology.

Keywords: Dementia, music based rehabilitation, linguistic-cognitive based rehabilitation, tablet PC

[S-071]

Intensive treatment in occupational therapy to reduce hip prosthesis dislocation risk in patient with cognitive impairment

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Objective: Old patients with cognitive impairment who had undergone hip replacement have a higher risk of prosthesis dislocation. The aim of the study was to verify if our method, which is based on multi-sensorial stimulation and multiple repetitions of recommendations, can lead to better memorization of the correct positions to take and the proper movements to perform to reduce the risk.

Materials-Methods: We enrolled 10 elderly patients hospitalized at our neurorehabilitation unit. Every patient was assessed by a psychologist who administered the MMSE to test for dementia and its severity and the Rey 15 Item Test of memory impairment. Each patient underwent the Images Test (which we developed, with images of correct and forbidden positions) and was asked to choose the correct ones. The patients were observed by an occupational therapist and asked to perform specific actions (according to the Observational Test that we also developed). The score from both tests was obtained at admission and at discharge. We randomized the patients into 2 groups of 5 persons. The treatment group underwent an intensive treatment based on multisensory stimulation performed by images, sounds, oral and practical explications of correct and forbidden position and correct performance of daily activity; the treatment lasted for 1 hour each day for 15 days. The control group underwent a standard training in occupational therapy of 30 minutes for 10 days.

Results: Both groups experienced an improvement in knowing which are the correct positions to take and the proper action to perform. The treatment group had statistically significantly higher differences between admission and discharge both on the Image Test ($p=0.015$) and on the Observational Test ($p=0.027$).

Conclusion: Old patients with cognitive impairment submitted to this intensive treatment of occupational therapy achieve a better retention of useful information to reduce hip prosthesis dislocation risk.

Keywords: Hip prostheses, cognitive impairment, occupational therapy, prosthesis dislocation risk

[S-070]

Occupational therapy groups promoting wellbeing and occupational performance of older adults

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Objective: The aim of this study was to examine the benefits of the occupational therapy intervention programs Life Balance (LB) and Culture Empowerment (CE) for wellbeing and occupational performance of community-living older adults.

Materials-Methods: The participants ($n=60$) in the study were 60-year old or older adults with perceived dejection or difficulties in activities of daily living. They were assigned either to the LB group ($n=30$) with weekly meetings and 3-5 home visits during 21 weeks, or to the CE group ($n=30$) including 12 weekly meetings. The outcome measures were the Canadian Occupational Performance Measure (COPM), Beck Depression Inventory II and WHO Quality of Life-BREF for the pre-, post-intervention and six-month follow-up.

Results: All groups showed an effect in post-intervention measures regarding occupational performance ($p=0.001$) and occupational satisfaction ($p<0.001$), psychological and social dimensions ($p=0.005$, $p=0.027$) of quality of life and decreasing symptoms of depression ($p<0.001$). At the six-month follow-up, these effects were maintained. There was no significant difference between the two groups.

Conclusion: The results show that the OT group intervention improved quality of life, occupational performance and decreased symptoms of depression in community living older adults with dejection or dissatisfaction in everyday activities.

Keywords: Occupational therapy, Older adults, group intervention, wellbeing

[S-072]

Co-operation between non-governmental organizations and public sector in finnish rehabilitation

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Objective: The objectives of this project are: (1) to collect data on the relationships between non-governmental organizations (NGOs) and the public sector (i.e., municipalities) in rehabilitation, and (2) to help in starting and developing NGO-municipality co-operation in two case studies.

Materials-Methods: This project surveyed 300 welfare and health NGO representatives and expert employees from ten municipalities on regarding types of co-operation, financing, and factors promoting and prohibiting co-operation in rehabilitation. We also interviewed 13 NGO representatives and collated their experiences on co-operating with municipalities. The first case study concerns developing co-operation between a drug rehabilitation centre and municipality social and health services. We have begun work on a second case study on starting an experts-by-experience mentoring program to help bridge social workers and mental health and drug abuse clients.

Results: There are three types of municipality-NGO co-operation: (1) joint development of rehabilitation services, (2) public service provision, and (3) grants (both monetary and of facilities). The rehabilitation NGOs operations are most commonly funded by municipalities (54%), Finland's Slot Machine Association – RAY (43%), and The Social Insurance Institution of Finland – KELA (19%). Joint goals, clearly defined tasks, open discourse, knowledge about partners' actions, as well as regular meetings promote co-operation. Rehabilitation system inconsistency, legal framework inconsistency, different action models and rules between partners, and lack of financing hinder co-operation. In the case of the drug rehabilitation centre, the challenges for co-operation include a marginalized clientele and recognizing their needs, building rehabilitation pathways, relationship with municipal services, and ensuring the continuity of operations.

Conclusion: The administration of municipality-NGO co-operation is challenging and lacking. Mental and substance abuse clients are a heterogeneous and partly marginalized group, for whom access to rehabilitation requires special support.

Keywords: Rehabilitation service, co-operation, public sector, NGOs

[S-073]

To give names to driving forces - The importance of feelings like desire, longing and vanity in rehabilitation for return to work

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Objective: An earlier study states that the terms of desire, longing and vanity carry with them ideas, emotions and values that influence how individuals perceive themselves and their rehabilitation situation. Our aims was to (i) clarify the terms desire, longing and vanity and (ii) investigate through literature searches whether these terms are used to described feelings as driving forces for return to work in the vocational rehabilitation literature.

Materials-Methods: To achieve these two objectives we used a model concept analysis. The final step in the model is to define empirical references, for example articles within the scientific literature, to determine the existence of a concept in a given situation.

Results: The concept analysis resulted in 15 new searchable terms. All of these were accepted in the thesaurus system for the databases we used. We identified 53 scientific articles that were deemed relevant to the purposes of the study. Of these, only 17 were published in the vocational rehabilitation field. The rehabilitation literature did not provide answers to the significance of emotions in the rehabilitation process. Instead, we found research that highlights in a deeper way the significance of emotions in the context of work in related research literature, such as sociology and psychology.

Conclusion: Our research suggests that emotions as driving forces in the rehabilitation process are an under-valued human capital in order to get people back to work or meaningful activity after long-term sick leave.

Keywords: Emotions, employment motivation, reemployment

[S-075]

Functional capacity evaluation testing in examining work disability in medical rehabilitation: A proposal of a standardized short fce protocol

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Objective: Workplace-orientated medical rehabilitation (WMR) is an effective strategy for rehabilitating patients with long term work disability due to chronic musculoskeletal diseases (CMSD). A core element of WMR is a functional capacity training based on the individual's working conditions. To evaluate physical capacity, functional capacity evaluation (FCE) protocols are essential. Because of time and effort, there is a need for standardized and valid short FCE protocols. However, it is unclear which single tests should be integrated in short protocols.

Materials-Methods: The sample comprised blue-collar workers with CMSD receiving WMR. Isernhagen's WorkWell FCE was performed during rehabilitation. This FCE consists of 29 tests in different domains. Additionally, a questionnaire relating to health-related and work-related baseline information was completed at admission. Work disability was measured with long-term sick leave and a negative subjective return-to-work (RTW) prognosis at admission. The effect of the FCE tests on these outcome criteria was estimated with logistic regression models adjusting for age and gender.

Results: 168 participants were considered in our analyses (mean age 46.3 years, SD 9.3, 21.9% women). All tests were significantly associated with long-term sickness absence except for sitting and hand coordination. Six tests also had a significant association with the negative RTW prognosis; another 4 tests were associated with $p < 0.10$. However, the model fit of all models was low (McFadden's R^2 : 0.033 to 0.097).

Conclusion: Single FCE tests were associated with work disability. Based on these findings, a proposal of a standardized FCE protocol including 6 tests (one of each domain) was developed. Future research should compare the predictive validity of the short and the full FCE protocol and the feasibility of a short protocol in rehabilitation.

Keywords: Work-oriented medical rehabilitation, chronic musculoskeletal diseases, functional capacity evaluation protocol, work disability, functional capacity training

[S-074]

Impact of powered wheelchairs and scooters on social participation - A multicenter observational study

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Objective: To evaluate the impact of powered wheelchairs (PWC) or scooters (PS) on every-day social participation in Finland.

Materials-Methods: Seventy-two voluntary and eligible adults over 18 years of age, receiving a PWC or PS for the first time, were consecutively recruited from 10 assistive technology centres between February and December 2011. Baseline and one-year follow-up interviews on participation to 20 activities were conducted using the Nordic Mobility-related Participation Outcome of Assistive Device Interventions (NOMO 1.0) and an ICD-10-based list. McNemar's tests, paired t-tests and Wilcoxon Signed Rank tests were used for statistical analyses.

Results: Sixty-eight participants consented to participate, but 11 withdrew. Of the remaining 57 users (mean age 55, range 32-76 years), 68% were women, and 98% lived in ordinary houses. After one year of the PWC/PS use, the user's expectations of the PWC/PS were reportedly fulfilled better than (63%) or as expected (28%), and 86% of the participants indicated that PWC/PS had a significant impact on their possibilities to participate in different activities. The need for help was reduced for getting in and out of their homes ($p=0.003$) and moving inside ($p=0.030$). There was no change in the mean number of activities participated (change 0.2, SD 2.4, 95%CI -0.8-0.4). Going to grocery shop was the only activity that statistically significantly increased ($p=0.048$) with PWC/PS. The participants reported that it was easier to go out for a walk ($p=0.012$) or visit a grocery shop ($p<0.001$), letter box or post office ($p=0.012$), library ($p=0.019$), and friends or relatives ($p=0.018$).

Conclusion: PWC and PS are reportedly important for most users. They can decrease the need for help and ease mobility-related participation in some ordinary activities common to everybody, but they do not necessarily increase frequency of participation. As important as they are, powered devices cannot solve all participation restrictions, so solutions may be sought elsewhere, e.g., from more accessible environments.

Keywords: Assistive devices, powered mobility, participation, impact evaluation

[S-076]

Predictors of return to work after vocational retraining. A systematic review of the German literature

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Objective: Vocational Rehabilitation (VR) is an essential element of interventions for people with work disability due to chronic diseases. The activities are heterogeneous; vocational retraining is of particular importance. These interventions are cost-intensive, take very long and have a specific impact on the main goal, the return to work (RTW). However, the success of vocational retraining is not only dependent on the intervention quality. Apart from methodical influences, the attributes of the personal and environmental context are discussed. To know the potential predictors is a necessary condition for a valid analysis of the intervention quality.

Materials-Methods: A structured review was conducted. All studies meeting the following criteria were integrated: publication from 2005 to 2011; the context of the German rehabilitation system and vocational retraining; a multivariate analysis of RTW predictors.

Results: 15 publications from 6 studies were included. The evaluation of evidence was based on 9 prediction models. Strong evidence of the effect on RTW could be found for income, subjective health rating and regular completion of retraining. Moderate evidence was observed for age and target job. Strong evidence against an effect on RTW was observed for employment and occupational status before admission. There was moderate evidence against an RTW effect of gender, education and locus of control. Ambiguous evidence was obtained for the local job market, the type of retraining, social support and mobility.

Conclusion: The review provides findings on the prediction of RTW following vocational retraining. On the one hand, these findings can lead to an advance of intervention quality due to consideration of special personal and/or environmental factors. On the other hand, there is still a lack of information in this field. There is a special need for studies that can illuminate this lack of information.

Keywords: Vocational rehabilitation, vocational retraining, return to work, systematic review, predictors

[S-078]

Quality assurance of medical decision making about applications for disability pension in the German pension insurance

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Objective: Applications for disability pension have to be reviewed by medical experts. To ensure a high quality standard of these expert opinions, the German Pension Insurance has developed a specific quality assurance system. It comprises hierarchically structured requirements which are composed of six basic criteria (e.g., formal quality, sufficiency) and one general criterion (general transparency of the review). The latter refers to the degree to which another expert is able to reconstruct the process of medical decision making. Furthermore, the quality assurance concept consists of a peer review system in which anonymised expert opinions are re-evaluated by specially trained medical experts. These peers evaluate the degree of compliance with the requirement criteria in every single case in a three- or four-stage rating process. The objective of our pilot study was to consider the suitability of the proposed quality assurance system for daily use and to analyse the reliability of the peer review.

Materials-Methods: We used 260 anonymised expert opinions on disability pension applications delivered by 12 regional pension insurance funds. 20 of the expert opinions were randomised and reviewed by each of the 19 involved peers. All the other expert opinions were each reviewed by two of the 19 trained peers.

Results: The peer review was conducted between July and November 2011, assisted by an online-tool for distribution of expert opinions and recording of rating data. The peer review system proved to be practicable, as confirmed by the feedback of the participants. Inter-rater reliability (Kendall's W) was 0.37 (overall coefficient for the general criterion).

Conclusion: Reliability of our peer review of medical expert opinions regarding disability pension applications is moderate, but it appears to be sufficient to warrant implementation. Various suggestions are used to revise the formulation of the criteria in order to further improve the quality measures. Implementation of the peer review system requires periodical training of all the peers involved.

Keywords: Medical decision making, quality assurance, application for disability pension, peer review, evaluation

[S-080]

"Little by little, one goes far" or "How to make paraplegics walk again"

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Objective: After a spinal cord injury, the patient has to deal with the loss of motor and sensory function below the injured segment. Most of the patients are forced to depend on a wheelchair. They are unable to walk or even stand. This non-physiological situation causes osteoporosis, pressure ulcer, contractures, constipation, urinary tract infection because of urinary retention, obesity, and sometimes neuropathic pain at the border zone of the injured segment, summarily resulting in increased spasticity. Beside these medical problems, one should not underestimate the psychological effects of being at eye level with other humans and being able to stand or walk again, even just for a short distance. For this purpose, one can use therapeutic devices such as different kinds of splints or orthoses, like HKAFs or KAFOs. Most of the patients "walk" by using parallel bars and/or a walking frame. These therapies are exhausting. The latest technical innovations bringing the paraplegics one step forward on the way to a normal gait are the so called exoskeletons.

Materials-Methods: From January till June 2013 we have had the opportunity to test two of these walking devices (ReWalk and Ekso) with 16 paraplegics (ASIA A and B, injury level Th3 or lower).

Results: The first results show a positive influence for the subjective well-being of the patient, improvement of physical fitness, weight loss, reduction of contractures and spasticity. Unfortunately, we have also seen pressure ulcer and activated arthrosis in a few cases.

Conclusion: We report about our experiences with two exoskeleton devices, the medical and psychological effects, the therapeutic usability for rehabilitation in a clinical setting and also the drawbacks. In addition, we will give a short overview of the other possibilities to help paraplegics walk again.

Keywords: Spinal cord injury, paraplegics, walking, orthoses, exoskeleton

[S-079]

Improvement of rehabilitation in spinal cord injury -The boberg quality score

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Objective: The Boberg Quality Score (BobScore) is a study to develop a new score for rehabilitation of people with spinal cord injury (SCI). We present the guidelines of the BobScore. The quality of hospital rehabilitation is not defined only by the outcome immediately after admission, but also by the ability to maintain and even enhance the results especially concerning social and vocational (re)integration. The patient's behaviour during and after rehabilitation is not unidimensionally determined by the state of health, but also depends on the individual's motivation, knowledge, independence and social support.

Materials-Methods: 309 people who had suffered acute SCI were included. The time frame of the study was 3 years. The following standard measurements were used to get the data for the BobScore: ASIA classification, SCIM-II, the Communication part of the FIM, and the NHP as an assessment tool for quality of life. Self-management and self-confidence competences were also measured.

Results: 215 people took part in the study for more than 3 months. The dropout rate was 18%. 30 months after admission, 46% of the participants had complete data. The SCIM II was increasing overall from the beginning of rehabilitation to 30 months after discharge. However, 6 months after discharge no more improvement on the SCIM II was statistically detectable. Overall, we observed rising competence for self-management skills and constant competence for self-confidence skills.

Conclusion: There are only a few parameters that have major impact as predictor of social reintegration for persons after SCI: SCIM II, self-management-competence as measured by RPF, and self-confidence competence as measured by RPF. The predictor quality of the BobScore regarding social reintegration is higher than of the SCIM II. Parts of the BobScore could be a reasonable addition to the SCIM II or another scale in the future.

Keywords: Spinal cord injury, quality score, clinical outcome, life expectancy

[S-082]

The effect of the internet use on the quality of life in people with spinal cord injury

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Objective: The Internet is a global system of interconnected computer networks. It allows computer users to remotely access other computers and information stores easily, wherever they may be. The Internet is also a tool that helps in managing the activities of daily living. The aim of this study was to evaluate the effect of the Internet use on the quality of life in people with spinal cord injury (SCI).

Materials-Methods: 55 SCI people (11 female, 44 male) with a mean age 39.8 years (SD 15.6) were included in the study. The SF-36 Health Survey was administered to people with SCI living in the community. The study group was divided into two groups: group 1 consisted of 33 people with SCI using Internet; group 2 consisted of 22 non-Internet users with SCI.

Results: We found no statistically significant difference between the two groups in any of the subscales of the SF-36 Health Survey (all $p > 0.05$).

Conclusion: Although there are some arguments in favour of a positive influence of the Internet use, our study found that the Internet use has no significant effect on the quality of life of people with SCI.

Keywords: Internet, quality of life, spinal cord injury

[S-083]

Analysis of career choice in halted projects

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Objective: The objective of this study was to analyze and to question the selection process of a career choice to people with physical disabilities acquired by spinal cord injury who are treated in the Rede Sarah center for rehabilitation of people with neurological sequelae. Our theoretical basis was psychology, based on phenomenology and existentialist philosophy.

Materials-Methods: We present how the vocational counselling offered within a rehabilitation facility ultimately defines the decision for a new career choice, taking as reference the conception of truth in relation to "correction" and "normalization" by overcoming the deficiency, and techniques as a means of productivity. Pointing to the limits that this model has, we present another possibility of action against the choice of a professional activity whether or not the notions of truth and technique can be rethought. We use the term "analysis" instead of guidance to emphasize that the proposed analysis of choice implies allowing other directions to show up along the way.

Results: Our study brings no quantitative results. The purpose of the analysis of career choice in this rehabilitation program is related to allow other meanings and to understand what to do when the hegemonic demands related to productivity are imposed.

Conclusion: Our study is more focused on qualitative results; the individuals are at free will to choose to return to work, not to return to work or to choose another job or work after spinal cord injury. We present the perceptions of individuals about these questions.

Keywords: Analysis of vocational choice, spinal cord injury, rehabilitation, existentialist psychology

[S-085]

Secondary impairments in persons after lower limb amputation

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Objective: Persons after lower limb amputation may have secondary impairments, such as hip pain on both sides, knee pain on the non-amputated side, low back pain and osteoporosis. The aim of the study was to find out the frequency of secondary impairments and their causes in the patients after lower limb amputation visiting our outpatient clinic.

Materials-Methods: All patients after lower limb amputation who visited the author's outpatient clinic between September 1st and December 31st 2012 and were amputated at least 2 years before, were included in the study. A structured interview was performed, and clinical data were collected and analysed.

Results: Thirty-seven subjects (33 men) were included into the study, with an average age of 59 years (range from 22 to 93 years). They were assessed 17 years (from 2 to 67 years) after the amputation on average. They walked 3.1 km per day on average (from 0 to 10 km). Seven (19%) had hip pain on the non-amputated side, two (5%) on the amputated side, thirteen (35%) had low back pain and eight (22%) had knee pain on the non-amputated side. The longer the time after the amputation, the more frequent was the knee pain ($r=0.407$, $p=0.029$); heavier patients had experienced back pain for a longer time ($r=0.663$, $p=0.019$). No other statistically significant correlations were observed between frequency, severity or duration of pain and age, time since the amputation, daily walking distance, weight, number of problems regarding body functions, body structures, activities and participation or number of barriers and facilitators in their environment.

Conclusion: A smaller percentage of the patients included in our study had secondary problems such as hip, knee and low back pain with respect to the findings of other authors. Due to the small number of participants, we were also unable to identify factors clearly related to the secondary impairments.

Keywords: Rehabilitation, lower limb amputation, secondary impairments

[S-084]

Benefits of scuba diving for individuals after spinal cord injury

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Objective: Scuba diving could be a part of rehabilitation and recreation for persons with chronic Spinal Cord Injury (SCI). Since 2002, IAHD Adriatic has developed several programs for individuals after SCI. Activities are performed in swimming pools as a part of modern hydrotherapy and in open water as basic and advanced diving training. More than 40 trainees from the Adriatic region have participated in the last ten years.

Materials-Methods: Beside the information regarding the dive exposure (depth, duration, water temperature etc.), the SCI subjects were asked to estimate their subjective perception of wellbeing and degree of fatigue before and after dives. A ten-point scale, similar to the Visual Analogue Scale (VAS) for pain, was used. On the scale of wellbeing, 1 means very unsatisfying while 10 signifies a very satisfying state. On the tiredness 10-point scale, 1 is very tired while 10 means not tired at all.

Results: The mean estimate of tiredness and wellbeing before and after the dive was 7.7, 7.6 and 7.5, 7.8, respectively. In 11% of the dives the estimated wellbeing was lower and in 24% tiredness increased after the dive.

Conclusion: In the last ten years we have noticed that immediate effects of diving were minor and mainly beneficial. However, improved health and the quality of life of disabled divers could be the effect of hydrotherapy, accompanied by regular physical activity, improved social interactions, psychological benefits of achievements and fulfilled life. Despite the fact that until now disabled participants have not had any noteworthy medical complications, we believe that vigilance must be maintained. Systematic data collection, their analysis and documentation of experiences have increased our knowledge and contributed to dive safety for SCI subjects.

Keywords: Hydrotherapy, therapeutic diving, scuba diving, spinal cord injury, physical disabilities

[S-086]

New challenge of functional electric stimulation for drop foot

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Objective: Functional electric stimulation (FES) is based on the electric stimulation of the neuro-muscular tissue that lacks normal nervous control, allowing an involuntary muscular contraction to occur. FES has several clinical uses; one of them is to assist gait.

Materials-Methods: We examined the scientific publications on some of the major FES-assisted walking devices that have been developed for experimental and commercial purposes over the last decades, including drop foot stimulators, multichannel stimulators and hybrid orthotic systems.

Results: FES is an effective method for the treatment of gait disorders, mainly in stroke and spinal cord injury, improving the gait pattern. In some patients with stroke, randomised controlled trials have demonstrated the superiority of FES over conventional treatment (mainly ankle foot orthosis). The first applications of FES date back to the 1960's. The latest technological innovations resulted from the introduction of multichannel stimulators that are able to apply a different variety of stimulus profiles, and new sensing modalities combining inertial and force sensitive resistors. New concepts in drop foot stimulation have been recently developed with the introduction of natural sensors, implantable electrodes and minimally invasive micro-stimulators, such as the BION (BIOncic Neuron).

Conclusion: FES-assisted walking devices have therapeutic benefits that mainly include the increasing of gait velocity. Beyond the functional benefits, FES aids in decreasing spasticity and improvement of muscle strength and bone density.

Keywords: Functional electric stimulation, drop foot, gait

[S-087]

Comparing gait kinematics in overground turning and turning on a rotating treadmill

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Objective: The purpose of this study was to determine whether turning on a rotating treadmill resembles overground turning in healthy individuals.

Materials-Methods: We developed a mechanism which is capable of rotation around the vertical axis (yaw rotation). On top of this mechanism we fastened a linear treadmill thus obtaining a treadmill capable of rotation. Rotation (angular speed) of the treadmill was electronically controlled. Ten healthy volunteers first performed overground turning along circular paths of different radii and then turning on a rotating treadmill. Each individual completed the circular path in a predetermined time so that experimental conditions regarding linear and angular velocity were close to those on a rotating treadmill. Opto-reflective markers were placed on individuals and gait kinematic data were recorded with the Vicon motion analysis system.

Results: From the positions of the reflective markers we calculated hip, knee and ankle angles and orientation of torso and pelvis during overground walking and walking on the rotating treadmill. Results show that individuals displayed similar torso and pelvis rotations during overground and treadmill walking and there were also no major differences in hip, knee and ankle angles in both experimental conditions.

Conclusion: The fact that relations between pelvis and torso rotations as well as hip, knee and ankle joint kinematics were consistent during treadmill and overground turning suggests that test subjects used a similar postural mechanisms during overground walking and when walking on a rotating treadmill. This indicates that rotating treadmill provides similar training conditions as in overground turning.

Keywords: Overground turning, rotating treadmill, pelvis rotation, torso rotation

[S-092]

Neuroimaging and functional levels in cerebral palsy

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Objective: The aim of our study was to analyze the interrelationship between magnetic resonance imaging (MRI) findings, types of cerebral palsy (CP) and function.

Materials-Methods: We analyzed the MRI of 58 children with CP. The clinical presentation of the CP was described according to the SCPE (Surveillance of Cerebral Palsy in Europe). Motor impairment was measured by the GMFCS (Gross Motor Function Classification System) and the associated deficiencies (epilepsy, sensory impairments, neuropsychological disorders) were identified.

Results: Seventy percent of children had bilateral spastic CP, 21% had unilateral CP, 5% had dyskinetic CP, and 7% had ataxia. Twenty-four percent were at the level II of the GMFCS, 21% at the level III and IV, and 33% at the level V. More than half of the children were unable to walk (54%) and 35% had multiple handicaps. The most common abnormalities identified on MRI were grey matter lesions (basal ganglia and thalamus damage, deep brain [sub cortical] grey matter injury) (43%), cerebral malformation (38%), diffuse grey matter injury (33%) and periventricular white matter injury (31%). Severe CP (GMFCS level IV-V) and bilateral spastic CP were associated with the neuroimaging findings of grey matter injury, periventricular white matter injury and thinning of corpus callosum. Spastic hemiplegic CP was associated with cerebral vascular accident. Epilepsy (74%) and language disorders (100%) were associated with diffuse grey matter injury.

Conclusion: Our results indicate the clinical value of MRI findings and particularly of deep and diffuse grey matter injury for early identification of motor and functional impairment in infants with spastic CP.

Keywords: Cerebral palsy, neuroimaging, gross motor functional classification system

[S-088]

Gait analysis of seniors at risk of falls

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Objective: Our research focused on methods of evaluation of seniors who are identified as fallers before and after a gait training, in order to be able to evaluate the rehabilitation effect.

Materials-Methods: Linear and nonlinear gait analysis was used. The study included 10 young persons (mean age 25.9 years, SD 4.2), and 9 seniors (mean age 69.3 years, SD 4.6). No participant reported any problems with gait or stability. We performed the 6-minute walking test (6MWT). The young subjects walked on grass and the seniors walked on a flat surface of 30 m length. A wireless 6-dimensional inertial measurement unit (6D-IMU) called S-Sense was used. Two S-Sense modules were attached, one to each foot; the signals were transmitted wirelessly to the S-Sense base connected to a PC. Lyapunov exponent (LyE) and correlation dimension (CD) were evaluated to estimate nonlinear parameters of gait. They describe dynamic patterns of the gait and help discovering irregularities.

Results: The mean walked distance in 6 minutes at self-selected velocity was 569.45 m in the young group and 428.25 m for the seniors. The obtained values coincide with the data from the literature for these groups. Both nonlinear parameters (LyE and CD) had higher values for the seniors. Higher positive values of LyE indicate a more chaotic behaviour that has impact on a higher risk of falls.

Conclusion: Our main goal was to test a new measuring device developed at within the SMILING project. Our trials with seniors provide preliminary data for further research with seniors at risk of falls. The obtained parameters are comparable with those from other laboratories. We proved the usability of nonlinear gait evaluation by the infrequently used LyE and CD.

Keywords: Seniors, fallers, measurement, gait parameters, training efficiency

[S-093]

The effect of short-term practice on reaching behavior of preterm infants: A randomized controlled trial

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Objective: To examine the influence of short-duration practice on the reaching behavior of preterm infants at the onset of goal-directed reaching.

Materials-Methods: The participants were 36 late preterm infants (mean 16.2 weeks, SD 1.8, of chronological age) allocated into groups that received blocked practice, serial varied practice, or no practice. The practice consisted of 4-minute sessions of stimulated reaching using a rubber toy in 3 activities guided by a physiotherapist. The activities were elicited in separate blocks for the blocked practice group and in a pre-established varied order for the serial varied practice group. The control group stayed in the physiotherapist's lap but was not stimulated to reach. The infants were assessed on average 3.3 days (SD 1.4) after the onset of goal-directed reaching three times: pre-training (immediately before training), post-training (immediately after training), and during retention (24 h after post-training). During assessments, the infants were placed in a chair and a rubber toy was presented at their midline within reaching distance for 2 minutes. The number of reaches and proportions of uni- and bimanual reaches were obtained from video recordings.

Results: There were no statistically significant differences between the groups in the number of reaches at pre-training ($p=0.42$). From pre- to post-training, the number of reaches increased ($p<0.01$) in the serial varied practice group, yet this increase was not retained during retention ($p=0.01$). This group also showed decrease in the proportion of unimanual reaches ($p=0.05$) and increase in the proportion of bimanual reaches ($p=0.05$) from pre- to post-training. There were no differences between the tests in the blocked practice and in the control group.

Conclusion: A short bout of guided serial varied practice facilitated hand-toy contacts and bimanual strategies at the onset of goal-directed reaching in preterm infants. However, changes in reaching behavior were observed only immediately after practice. Future work should assess whether the changes in reaching consolidate after more intensive practice.

Keywords: Premature birth, early intervention, task performance, learning

[S-094]

Effect of short-duration training on distal adjustments of reaching in preterm infants with low birth weight

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Objective: To verify the effect of short-duration training on distal adjustments of reaching in preterm infants with low birth weight (PT) as compared to full-term infants (FT).

Materials-Methods: The participants were 16 infants allocated into two groups: 8 PT infants (mean 33.0 weeks of gestation, SD 1.5; mean birth weight 1.80 kg, SD 0.40) and 8 FT infants (mean 38.4 weeks of gestation, SD 1.2; mean birth weight 3.05, SD 0.48 kg), all with adequate motor performance according to the AIMS (percentile between 25 and 75). The infants were assessed at the onset of reaching (PT: mean age corrected for prematurity 3.3 months, SD 0.5; AT: mean age 3.5 months, SD 0.5) in a baby chair reclined at 45°. Between pre- and post-training assessments, only the PT infants received one single session of training under serial practice condition, with a malleable rubber toy that was also used for the assessments. The assessments were recorded by three digital video cameras and the images were analyzed using the Dvideow 5.0 system. The distal adjustment variables were: hand opening (open, closed, semi-open), hand orientation (horizontal, vertical, oblique), and surface contact of the hand (ventral, dorsal). Analysis of variance was used for statistical analysis.

Results: in both groups there was an increase of semi-open hand adjustments ($F=6.9$, $p=0.009$) during post-training. There was an increase of the frequency of dorsal hand adjustments during post-training ($F=4.4$; $p=0.050$) in the PT group (mean 8.8, SD 6.3) as compared to the FT group (mean 2.5, SD 1.6). There was also an increase of the frequency of oblique hand adjustments during post-training ($F=4.3$, $p=0.050$) in the PT group (mean 7.6, SD 3.3) as compared to the FT group (mean 4.0, SD 2.1).

Conclusion: After the training, the PT group increased the frequency of semi-open, dorsal and oblique hand adjustments compared to the FT group. It seems that these behaviors were compatible with the intrinsic dynamics of PT infants at the period of reaching onset and with the type of object used (small and malleable).

Keywords: Reaching, hand, training, preterm, motor control

[S-096]

Relationship between psychological symptoms of parents of cerebral palsy patients and factors that affect the life of cerebral palsy patients

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Objective: The purpose of our study was to understand the relationship between psychological symptoms of parents of cerebral palsy (CP) patients and the variables that affect CP patients (such as functional state and admission to hospital).

Materials-Methods: 50 CP patients and their parents participated in our research at a pediatric rehabilitation clinic. The parents completed a 32-question survey which included SCL-90-R and SF-36. The SCL-90-R is a psychometric questionnaire composed of 11 symptom dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism, additional items and global severity index. The SF-36 is an 8-domain health survey which comprises physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional and mental health.

Results: The mean age of CP patients was 7.4 years (SD 3.3) and the mean age of their parents (mainly mothers) was 33.9 years (SD 7.9). The scores on the depression dimension of the SCL-90-R were very high (mean 2.55, SD 0.92). The education of the parents was mostly elementary school. The correlations between symptom dimensions of SCL-90-R and the number of household members were positive. A positive correlation was also found between the symptoms of interpersonal sensitivity and the number of children. The score on symptoms of hostility and the number of admissions to PMR clinic were found to be positively correlated. Neither SCL-90-R nor SF-36 was found to be associated with GMFCS.

Conclusion: Rehabilitation of CP patients requires teamwork, whereby the parents have key role. It is important to understand the psychological disturbances of the parents of CP patients. We found that the parents' psychological difficulties were not related to the functional state of patient. However, other loads, such as other children, crowded house and many admissions to the hospital, were severely psychology affecting the parents.

Keywords: SCL-90-R, cerebral palsy, psychology

[S-095]

Lifestyles of children with physical disability

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Objective: Physical inactivity and obesity are a public health problem. Their increase emphasizes the need to create conditions to promote, adopted and maintained behaviors that promote health. It had been observed that children and adolescents with physical disabilities (PD) practice less physical activity (PA) than their non-disabled peers. However, the majority of the studies conducted within the framework of special educational needs (SEN) are based on adult populations and are not specific to PD. Therefore, the goal of our research was to understand the factors related to the practice of PA by children and adolescents with physical disabilities (spina bifida) in order to develop intervention programs.

Materials-Methods: A questionnaire of lifestyle for students was developed and validated previously and applied to a sample of 25 children in regular schools with spina bifida, aged 10 and 17 years. The 29-question questionnaire was answered individually and in a self-administered way. We also applied a similar questionnaire to parents to study their influence.

Results: The results pointed out the lack of psychical activity by the participants: not only was PA not emphasized, but the children with spina bifida are generally not included in PA classes with their peers. The lack of PA will influence the lack of stimulation of others abilities.

Conclusion: Although there is ample scientific evidence base for the practice of physical activity in people without a medical diagnosis, there is a lack of similar research among the special population. The possibilities of the schools in this area are often limited due to the difficulty of children with motor disabilities in keeping up with other children. Other barriers were also identified in our study. The promotion of healthy and active lifestyle in special populations and outlining the appropriate intervention strategies for this population is one of the future goals in this field.

Keywords: Lifestyles, physical disability, physical activity

[S-097]

Radiofrequency denervation is ineffective to reduce chronic neck or low back pain: A meta-analysis

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Objective: To assess the effect of radiofrequency denervation (RFD) on pain intensity amongst patients with chronic back or neck pain, and to weigh the clinical significance of this effect.

Materials-Methods: Random-effect meta-analysis based on a systematic review with research quality grading according to the GRADE system was performed. The included studies were retrieved from MEDLINE and Cochrane CENTRAL databases from 1990 to January 2013. Randomized or non-randomized controlled studies were included if the study subjects had a history of chronic low back or neck pain and were treated with RFD. A study was included if it compared RFD with placebo. The outcome measure was the change in the visual analogue scale (VAS) score for pain during a follow-up.

Results: The meta-analysis included data on 374 subjects (191 cases and 183 controls) who participated in nine randomized controlled trials. The VAS score reduced in the RFD and the control groups. The mean reduction at the follow-up at 3.9 months (range 2 to 6) was -2.34 (SD 1.1) in the RFD group and -1.03 (SD 1.2) in the control group. The pooled mean difference between the groups was -1.15 (95% CI -2.03 to -0.27, $p=0.011$) VAS points, which is below the minimal clinically important level of VAS change. The test for heterogeneity indicated that study imputation would favour placebo.

Conclusion: There is strong evidence that RFD is not more effective than placebo in reducing pain intensity in patients who experience chronic neck or back pain. It is unlikely that further research on the subject would substantially affect this conclusion.

Keywords: Facet joint, zygapophysial joint, z-joint, ablation, dorsal rami

[S-098]

Promoting sustainability in the outpatient rehabilitation of male construction workers suffering from osteoarthritis of the knee joint with special reference to exercise therapy and ergonomic training

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Objective: The aim of the study was to evaluate the effects of outpatient medical vocational rehabilitation (OMVR) mainly composed of exercise therapy and ergonomic training for patients with osteoarthritis of the knee joint, focused on keeping up lasting effects.

Materials-Methods: In a prospective study, 63 male construction workers aged 45.4 years on average (SD 6.4) who were suffering from osteoarthritis of the knee joint first received OMVR over a period of three weeks 5 times weekly for 6 hours (phase 1). The phase 1 consisted of evidence-based musculoskeletal rehabilitation with the main focus on ergonomic training and muscular strength training. After completion of phase 1, the rehabilitation centre led the patients into sports groups near their place of residence (phase 2) to continue weight training for two times weekly besides work. The effects of the OMVR were evaluated at the beginning (T1) and at the end of phase 2 (T2) as well as 6 months later (T3).

Results: Compared to T1, physical fitness (mobility, muscular strength, endurance, gait symmetry) as well as health-related quality of life (SF-36), knee pain and associated functional limitations (WOMAC, PACT) were significantly improved in T2. 51 patients (81%) continued a muscular strength program in phase 2 and could preserve their health outcome in T3, while the effects of 12 patients breaking off any sporting activities wore off again to and even below the starting condition in T1.

Conclusion: In spite of work-related degenerative changes in the knee joint, positive effects of an outpatient vocational rehabilitation program could be stabilized persistently by regular muscle strength training once or twice a week. Our results emphasize the necessity to put strategies of aftercare into the concept of musculoskeletal rehabilitation.

Keywords: Vocational rehabilitation, osteoarthritis of the knee joint, ergonomic training, exercise therapy, promoting sustainability

[S-101]

Update of a systematic review on the effectiveness of medical training therapy for subacute and chronic low back pain

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Objective: Update of a systematic review that had considered research until October 2009 and tested the evidence for the effectiveness of medical training therapy (MTT) to improve muscle strength and endurance in reducing pain and improving function in patients with subacute and chronic low back pain (LBP; Scharrer et al., 2012).

Materials-Methods: Literature was searched with predefined terms in MEDLINE, EMBASE, CINAHL, Pedro (2009-2012) and the Cochrane Central Register of Controlled Trials. Two reviewers independently selected randomized controlled trials that had MTT as intervention and followed evidence based guidelines for MTT. Studies had to include patients with idiopathic subacute/chronic low back pain who were between 18 and 65 years old. Data extraction procedures on study characteristics, quality, and outcomes at follow-up examinations were identical to those used by our previous review. Visual analogue scale ratings (0-100%) with exact qualifiers at 0, 25, 50, 75 and 100% of the beam quantified the qualitative aspects of a MTT intervention. Studies with rating scores >75 were included. The main outcome measures were pain intensity and functional status.

Results: A total of 5 studies examined the effectiveness of MTT. One out of 3 LQ-RCTs trials found aerobic training therapy to improve pain and function significantly better than no further intervention, or a control intervention. High volume back strengthening (LQ-RCT) improved pain and function significantly better if compared to home exercises; and a mixed high dose supervised exercise program (strengthening and aerobic exercises; HQ-RCT) demonstrated a tendency toward a better pain reduction and improved function when compared to manual therapy or home exercises.

Conclusion: This update of our systematic revealed conflicting evidence for the effectiveness of MTT in the treatment of subacute and chronic LBP. Future high quality RCTs will have to clarify whether MTT is more effective than other therapeutic interventions.

Keywords: Therapeutic exercise, training therapy, back pain

[S-100]

The work ability index predicts application for disability pension in chronic back pain patients after work-related medical rehabilitation

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Objective: To investigate whether the Work Ability Index (WAI) identifies chronic back pain patients at risk of disability pension application and other patient- or physician reported adverse work-related outcomes.

Materials-Methods: Chronic back pain (ICD-10: M50 to M54) patients recruited at seven German inpatient rehabilitation centres completed the WAI at the beginning of rehabilitation. Disability pension applications and other patient-reported work-related outcomes were assessed by postal questionnaires three months after discharge. Physician-reported treatment outcomes were extracted from the standardised discharge report.

Results: The sample included 294 patients (mean age: 49.9 years, 57.1% female). Receiver operating characteristic curve analysis of the association of the continuous baseline WAI rating with a subsequent disability pension application revealed an area under the curve equal to 0.80 (95 % CI: 0.62 to 0.97). Youden's J was highest when the WAI cut-off was <=20 points (sensitivity: 72.7 %, specificity: 82.2 %). After adjusting for age and gender, a WAI rating of <=20 points was associated with 15.6 times higher odds of a disability pension application (95 % CI: 3.6 to 68.2), 4.9 times higher odds of unemployment (95 % CI: 1.5 to 16.8), 6.4 times higher odds of long-term sick leave (95 % CI: 2.5 to 16.0), and 2.1 times higher odds of a referral for further vocational rehabilitation (95 % CI: 1.0 to 4.2). The odds of physician-reported decreased capacity in the current job were 9.6 times higher in subjects with WAI scores <=20 points (95 % CI: 4.5 to 20.7). Moreover, patients with WAI scores <=20 points had 6.9 times higher odds of being recommended a light work load (95 % CI: 2.9 to 16.6).

Conclusion: The WAI could help rehabilitation professionals identify back pain patients at a high risk of application for disability pension.

Keywords: Back pain, disability pensions, work ability

[S-102]

The views of rheumatology occupational therapists of a vocational rehabilitation training programme

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Objective: Work disability in inflammatory arthritis (IA) is common. Rheumatology occupational therapists (OTs) are well-placed to identify people with IA's work problems as their role includes evaluating the impact of arthritis on functional ability, work and social roles. However, most OTs in the UK have little or no experience in vocational rehabilitation (VR).

Materials-Methods: As part of a pilot randomised controlled trial, a VR intervention was modified for use in the UK from an American study (Allaire et al, 2003). Rheumatology OTs (n=9) attended three-day training in this VR delivered by VR experts. Training included talks, practical sessions, co-teaching, role play, self-study, on-going mentor support, and a resource file with information on VR strategies, adaptive equipment, legislation and employment services. After training and intervention delivery with 2-3 patients each, semi-structured interviews with the OTs were conducted, recorded, transcribed and thematically analysed by three researchers to ensure validity.

Results: Two overarching themes emerged from the data. These were: the varying levels of prior knowledge and experience of VR amongst rheumatology OTs; and the need for a more comprehensive approach to VR training. All OTs found the training and resources very valuable, but several stated that the training programme assumed too much prior knowledge and expertise in VR. More comprehensive training, including more practical training, activity analysis and practising VR delivery with feedback were recommended.

Conclusion: Rheumatology OTs needed a more extensive VR training programme. For a full trial, we will extend this to 5 days including more practical experience.

Keywords: Rheumatology, work-rehabilitation, training, occupational therapists, qualitative research

[S-103]

Evaluating activity performance problems of patients with knee osteoarthritis

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Objective: Knee osteoarthritis is commonly associated with decreased activity and participation. The Canadian Occupational Performance Measure (COPM) is now a widely used and accepted outcome measure for clients with chronic conditions. The aim of our study was to determine the activity performance problems identified as most important by Turkish patients with knee osteoarthritis.

Materials-Methods: 75 patients participated in this study (mean age: 61.6 years, SD 11.9; 65 women). The data related to socio-demographic and clinical characteristics of the subjects were collected. We used COPM to evaluate the experiences of occupational performance and performance satisfaction of patients in their daily lives. Pain was evaluated with the McGill-Melzack pain score. Activity limitation and participation level were determined by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Health Assessment Questionnaire (HAQ).

Results: When the subjects were evaluated for performance problems with COPM, the most prevalent problematic activity of daily living (ADL) was climbing down the stairs (90.7%); other commonly reported problems were domestic works (77.3%), climbing up the stairs (74.7%), walking (72.0%) and shopping (65.3%). There were no statistically significant correlations between COPM and McGill-Melzack pain subscores, WOMAC subscores and HAQ scores ($p>0.05$). The correlation between all WOMAC subgroups and McGill-Melzack pain scores were statistically significant ($p<0.05$).

Conclusion: Climbing stairs, domestic works, walking and shopping were identified as the most frequently seen problems in patients with knee osteoarthritis. We believe that these ADL emphasize the need for individualized assessment of activities to enable appropriate interventions in rehabilitation programmes for knee osteoarthritis. More extensive studies with should be carried out in the future.

Keywords: Knee osteoarthritis, activities of daily living, pain

[S-104]

Access to multidisciplinary rehabilitation: Impact of different management strategies on the identification of patients with extensive work-related problems

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Objective: Workplace-oriented multidisciplinary rehabilitation (WOMR) has reached a substantial share in medical rehabilitation (MR) offered by the German Federal Pension Insurance (GFPI). Studies confirm higher effectiveness of WOMR for patients with extensive work-related problems. Therefore, specific identification and referral of these patients is of great importance. The question is whether different steering strategies influence the validity of the access management to WOMR.

Materials-Methods: The study was focused on patients with chronic musculoskeletal diseases. Six pension insurance institutions (PI) and seven rehabilitation centres (RC) offering WOMR were included. Different referral strategies concerning the place of decision (PI vs. RC) and the use of a screening (yes vs. no) were applied. The duration of sick leave and the Work Ability Index were used to identify extensive work-related problems. Effects of the different strategies on the steering decision (WOMR vs. MR) were tested in regression models.

Results: 614 patients were included in the study. The effect of the steering strategy varied considerably. A screening-based decision yielded a significant difference in times of sick leave between WOMR and MR (10.8 weeks) and in WAI (-5.5 pts). A decision without screening yielded no significant differences. There were comparable effects concerning the place of decision (RC: 6.9 weeks, -4.2 pts; PI: 8.1 weeks, -4.5 pts).

Conclusion: The results show the positive impact of a screening based steering strategy. The place of decision (PI as well as RC) did not influence the quality of decision. In consequence, the GFPI implemented a steering strategy on its own and included a specific screening instrument into the application documents for MR in routine work.

Keywords: Workplace orientated multidisciplinary rehabilitation, referral, steering, extensive work-related problems, screening instrument

[S-106]

The effects of ultrasound guidance on knee injections in osteoarthritis: A quasi-randomized cross-over study

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Objective: To demonstrate the role of ultrasound (US) guidance on knee injections regarding procedural pain, physician performance and short-term osteoarthritic knee symptoms.

Materials-Methods: Sixteen patients (24 knees) were included. Each knee received 2 consecutive injections (with a 2-week periods in-between). Each knee was injected by the same physician using the same supra-patellar approach, needle type and medication, only the technique was switched. The patients were quasi-randomized into Group I (8 patients, 12 knees: 1st blind, then US-guided injection) and Group II (8 patients, 12 knees: 1st US-guided, then blind injection). Knee examination, visual analogue scale (VAS), McGill Pain Questionnaire (MPQ), and Knee Injury and Osteoarthritis Outcome Score (KOOS) were the main outcome measures (assessed before and 2 weeks after each injection). Additionally, VAS, MPQ (for procedural pain) and the Operator Difficulty Scale (ODS) were used immediately post-injection.

Results: All the participants completed the study. In Group I, statistically significant improvements were observed regarding MPQ, KOOS (symptoms) and effusion ($p < 0.05$) only after the 1st injection. In Group II, significant improvements were in KOOS (pain/sport) after the 1st injection and in VAS after the 2nd injection ($p < 0.05$). When the change in the scores (before the 1st injection vs. after the 2nd injection) were considered, improvements were statistically significant in both groups ($p < 0.05$) with statistically significantly higher improvement of VAS in Group II ($p < 0.01$). Additionally, there was statistically significant reduction of painful ROM ($p < 0.05$) in Group II. When the degree of improvement (before vs. after each injection) was compared on the knee level between the 24 US-guided and the 24 blind injections, the outcome was similar ($p > 0.05$). Likewise, the procedure-associated pain scores were similar between US-guided and blind injections. The ODS showed higher difficulty scores for the US-guided technique ($p < 0.05$).

Conclusion: In the light of our preliminary findings, we believe that while US-guided and blind knee injections improve the short-term symptoms of OA patients, it is difficult to conclude that one type of injection is superior to the other. However, US-guided technique seems to be more difficult as the operators reported that it requires more time and effort.

Keywords: Knee, osteoarthritis, ultrasound, injection, pain

[S-108]

Ultrasound versus electromyography in the diagnosis of ulnar neuropathy at the elbow

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Objective: Comparing sensitivity and specificity of musculoskeletal ultrasound (US) and electrophysiology (EMG) in diagnosis of ulnar nerve entrapment (UNE) at the elbow.

Materials-Methods: 36 patients with clinical UNE and 20 healthy controls were enrolled to the study. They were referred to the Marmara University Physical Medicine and Rehabilitation outpatient clinic. The US and EMG were performed by two blinded researchers. In US, median and ulnar nerve cross-sectional areas (CSA) were measured from psiform, forearm, 6, 4 and 2 cm distal to medial epicondyle (ME), ME, 2, 4 and 6 cm proximal to ME levels. In EMG, nerve conduction studies of median and ulnar nerve and also inching studies of ulnar nerves were performed.

Results: The most reliable US finding for diagnosing UNE were maximum CSA of the ulnar nerve. The mean CSA of the UNE group was 11.33 (SD 3.24) vs. 8.8 (SD 2.2) of the healthy controls ($p < 0.001$). The sensitivity was 70.6% for US and 72.5% for EMG. The specificity was 75% for US and 67.5% for EMG.

Conclusion: US and EMG have similar sensitivity and specificity in diagnosing UNE. These two tools should be considered as complementary but not as alternative.

Keywords: Ulnar neuropathy at the elbow, ultrasound, electromyography

[S-107]

Applying dynamic parapodium in different central nervous system disorders as part of a rehabilitation programme

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Objective: To assess the effectiveness of a newly developed device called Dynamic Parapodium® as a therapy tool for patients with tetraplegia, diplegia and paraplegia, and to evaluate the tool in the traditional indications like multiple sclerosis, traumatic brain injury, stroke and in children with cerebral palsy. We also intended to find specific indications for timing and duration of usage of the device.

Materials-Methods: 25 patients (mean age 25.6 years, SD 21.8) with ataxia (n=2), paraparesis (n=4), hemiparesis (n=5) or tetraparesis (n=14) attended a total of 28 therapy sessions (one person participated in the programme twice and one three times). The Dynamic Parapodium® can provide an upright position for the patient. It can serve as a static verticaliser, but in addition it can be moved by leaning from side to side and the user can walk and turn on flat surfaces with it. The device can be adjusted to the patient's size. It was used twice a day for 30 minutes per session, in a two- or three-week period of time (10 to 14 weekdays).

Results: When comparing baseline and post-therapy muscle strength, there was a statistically significant improvement in the trunk muscles (affected right side m. erector spinae: $p = 0.03$), in the lower limb muscles (affected right and left side m. gluteus maximus: $p = 0.03$ and $p = 0.04$, respectively; affected right side m. rectus femoris muscle: $p = 0.01$). Much less change was observed in the muscle tone. With the exception of m. triceps surae with a significant tone reduction ($p = 0.01$), no significant changes were detected.

Conclusion: Back muscles and muscles around the hip gained functional strength. The effect of the Dynamic Parapodium® on the muscle tone was less remarkable. According to the clinical experiences, this device is useful for bridging the period between a static verticalizer and walkers in a shorter period of time.

Keywords: Dynamic Parapodium, muscle strength, muscle tone, cerebral palsy, stroke

[P-001]

Empowerment of the family based on adherence to physical activity in patients undergoing coronary artery bypass surgery

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Objective: The denial of physical activity after surgery is considered influential in the recovery of heart patients. This study examined the impact of the family empowerment model based on patients undergoing coronary bypass surgery, as a family-based intervention on patient adherence to physical activity and active cooperation of family members.

Materials-Methods: In this quasi-experimental study the intervention and the control group were tested twice. 102 patients who underwent cardiac surgery and 102 family members participated. Sampling was block-randomized. The patients undergoing elective vascular surgery who were literate and had a phone call after discharge from hospital were studied. The group empowerment for families regarded the four dimensions of perceived threat (severity and susceptibility), self-efficacy, educational participation and evaluation. The control group received routine care. Research tools used include demographic information, adherence to physical activity during the 8 weeks

Results: Adherence to physical activity levels in all patients before the intervention was similar in both groups ($p>0.05$). After the intervention, the intervention group had statistically significant better ($p<0.001$) adherence and cooperation of family members in adherence to physical activity.

Conclusion: Our findings suggest that the family-oriented empowerment model for patients undergoing coronary artery bypass is feasible and compliance with the improvement or modification of physical activity is achieved with the patients.

Keywords: Empowerment, coronary artery bypass surgery, adherence to physical activity, family members

[P-003]

Evaluation of musculoskeletal system disorders in the elderly people living in a rest home

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Objective: Musculoskeletal disorders in the elderly may impair self-sufficiency and quality of life. Early diagnosis and treatment of such diseases are possible. The aim of our study was to accentuate the methods of treatment and rehabilitation for preventing morbidity and mortality due to the existing diseases of the musculoskeletal system, detected in the elderly living in the rest home of our city.

Materials-Methods: Ninety elderly voluntary people (29 women, 61 men) living in the rest home of our city were included in the study. All participants' name and surname, age, occupation, duration of living at rest home, habits, diseases and use of medications were noted and musculoskeletal examination was carried out.

Results: The mean age of our study group was 77 (SD 8) years (range: 61-100). Frequently detected disorders were as follows: lumbar spondylosis (28%), knee osteoarthritis (26%), cervical spondylosis (16%), coxarthrosis (14%), lumbar radiculopathy (13%), hip prosthesis (10%), hemiplegia (10%), cervical radiculopathy (7%), extremity amputation (4%), rotator cuff lesions (3%), knee replacement (3%), bedridden (9%). In 60% of the elderly more than one musculoskeletal system complaints were found.

Conclusion: Musculoskeletal problems requiring physical therapy and rehabilitation were detected in 80% of elderly living at rest home. The elderly living at rest home included in this study could not receive regular physical therapy, rehabilitation or exercise program. Recommendations were made to elderly for the treatment of health problems. In our opinion, establishment of physical therapy units in such centers, providing continuous active service and training to elderly, may increase self-sufficiency and quality of life.

Keywords: Rest homes, elderly, musculoskeletal system problems

[P-002]

In-patient cardiac rehabilitation in elderly patients - Determinants of the rehabilitation outcome

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Objective: So far, outcome quality of cardiac rehabilitation (CR) was usually measured by individual parameters. Therefore, factors influencing the holistic outcome could not be determined. In the present study influences on a multiple outcome criterion (MOC) were investigated, which reflects the clinical rehabilitation outcome multidimensionally.

Materials-Methods: For 1,220 patients (mean age 70.8, SD 7.0 years, 78.3% men), who were enrolled from 02/2009 to 06/2010 at 10 cardiac rehabilitation clinics within the project EVA-Reha® (evaluation of rehabilitation), MOC could be calculated. This score measures the changes of 13 variables in three key areas (cardiovascular risk factors, exercise capacity, and subjective health) during CR with possible values on scale between -1 (worsened) and 2 (much improved). A multitude of conceivable outcome confounders was collected, including sociodemographic variables, baseline parameters of exercise capacity, risk factors and emotional status, comorbidities, duration of hospital stay, complications at acute hospital, as well as laboratory and echocardiographic data. Correlating variables in univariate statistical tests were multivariate analyzed using a mixed model with random intercept for center effect.

Results: The strongest impact on MOC (mean 0.6, SD 0.45) had smoking (MOC -0.15 vs. non-smoking, 95% CI -0.22 to -0.07; $p < 0.001$), female gender (MOC -0.07 vs. men, 95% CI -0.13 to 0.00; $p = 0.049$), depression (MOC +0.06 for change of one standard deviation (SD) on depression scale, 95% CI 0.02 to 0.10; $p = 0.003$), and hypertension (MOC +0.06 for change of one SD of blood pressure, 95% CI 0.02 to 0.09; $p < 0.001$). Furthermore, duration of hospital stay, heart rate, maximal exercise capacity and the rehabilitation center had a statistically significant effect.

Conclusion: Several determinants of rehabilitation outcome in elderly patients could be identified. They should be used for targeted treatment control in cardiac rehabilitation. Before general use, an evaluation in younger patients or outpatients is required.

Keywords: Cardiac rehabilitation, holistic outcome, determinants, influences

[P-004]

The importance of rehabilitation in physical violence cases to elderly people in Turkey

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The aim of this study is to provide information about elderly abuse and rehabilitation efforts in this field in Turkey for an intervention programme. Elderly abuse, meaning the abuse of an older person by a younger person or younger people, is an issue that has been existent since the ancient times. This is neither a time specific problem nor it is region specific. It exists in many societies around the world and many elderly can suffer because of this problem. Some of the elders living in Turkey are subjected to abuse as well.

According to the national statistics data, the percentage of elderly over 65 was 7.3% in 2011 in Turkey. The estimated rate will be 17.6% in 2050. Life expectancy was around 73 years for women and 69 years for men in 2010. It was estimated that life expectancy is going to be 77.3 by 2050. Higher life expectancy leads to an increased elder population in Turkey. As a consequence of living longer, many kinds of problems related to the elderly people emerge. Elderly abuse is one of the problems to be tackled and solved by the society and the authorities.

The importance of rehabilitation in elderly abuse cases and the efforts in our country will be presented.

Keywords: Geriatric rehabilitation, elderly abuse, rehabilitation

[P-005]

Inter-professional rehabilitation in older adults

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Rehabilitation is the combined and coordinated use of medical, social, educational and vocational measures for training or retraining the individual to the highest possible level of functional ability. The process of rehabilitation has to start early, it must be inter-professional and individually focus on older adults. The inter-professional team consists of physicians, psychologists, physiotherapists, occupational therapists, speech therapists, prosthetists, nurses, nutrition therapists, biomedical engineers, special education teachers and, lastly but importantly, family and friends. Currently, rehabilitation laws are being prepared in the Czech Republic. The laws relate to people with disabilities from their birth until their death.

We present a coordinated care plan for elderly people in the Czech Republic. 23% of the population in the Czech Republic is above the age of 60 years. The goal of rehabilitation is to achieve an optimal independent lifestyle in an individual's own environment for as long as possible, and to create a dignified lifestyle for the people who reside in rest homes. Our goal is to create an environment in which only 25% of elderly people are in residential care. The inter-professional rehabilitation team has to be aware of the fragility of older adults.

In conclusion, innovations in the field of rehabilitation in the Czech Republic mentioned above are relatively new. Our population is ageing and therefore the viewpoints must change and the facilities must be improved. We emphasise that the specific education of all professionals and non-professionals involved in the rehabilitation process is a necessary and important factor in understanding the needs of the elderly (and others affected by a disability). We must accept that one day we will all be old, and it is our responsibility now to think about the future.

Keywords: Inter-professional rehabilitation, fragility of older adults, inclusion

[P-006]

The effect of sleep disorder to mood, functional activity and quality of life in elder individuals

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Objective: The aim of this study was to investigate the interactions between sleep disorders, mood, functional situation and quality of life in the elderly.

Materials-Methods: A total of 160 patients over 65 years old participated. Demographic data were recorded; to determine the mental status, functional status, sleep disorders and quality of life, Mini Mental State Examination, Functional Activity Score, the Pittsburg Sleep Quality Index, the Yesavage geriatric depression scale and the SF-36 health survey were used.

Results: 64 of 160 patients had sleep disorders. The average age of individuals with sleep disorders was higher than the average age of individuals with no sleep disorders. There were no differences between two groups in gender, marital status or smoking. The participants had the highest sleep quality scores on subjective sleep quality, sleep quantity and sleep disturbance and the lowest scores on habitual sleep efficiency and the use of sleep medication. The average of depression in geriatric individuals who have sleep disorders was higher than the average of depression in geriatric individuals who have no sleep disorders. We found all functional activity scores to be lower in geriatric individuals who had sleep disorder. The dimensions of quality of life (physical function, pain, general health, energy, mood, and mental health score) were lower in the group with sleep disorders ($p < 0.005$). There were no differences between the two groups in physical role limitations and social function.

Conclusion: Negative impact on functionality and quality of life is very common in the elderly with sleep disorders. Sleep complaints that are source of disturbance and affects activities of daily life, should never considered as 'simply the normal aging'.

Keywords: Elderly, depression, sleep disorder, quality of life

[P-007]

A late diagnosed cervical myelopathy case

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Cervical spondylotic myelopathy is defined as spinal cord dysfunction secondary to external compression of the cord caused by degenerative disease of the cervical spine. It is the most common cause of myelopathy in adults over 55 years.

A 80 years old female with walking difficulty was referred to us from the neurosurgery clinic. The history revealed that she had progressive difficulty in walking that worsened in the last years. She had knee pain for several years, diagnosed as gonarthrosis and was walking with a cane. She did not want to be operated and had been treated conservatively. Slowly progressive worsening was thought to be caused by gonarthrosis and knee contractures. Once she had visited a neurologist for the stiffness in her legs; cranial MRI revealed small vessel disease, spinal stenosis and multiple intervertebral disc bulges were detected in the lumbar MRI. She had been administered symptomatic drugs. She became unable to walk independently for the last year. Six weeks ago she referred to a neurosurgeon for the pain in her arm and MRI of the cervical spine revealed spondylotic myelopathy from C3 to C5. Cervical decompression and stabilization operation was performed and she was referred to our clinic. On physical examination she had bilateral knee contractures (20 degrees extension limitation and 80 degrees flexion). Muscle strength was decreased in right upper and bilateral lower extremities. Deep tendon reflexes were found to be increased in the legs and normoactive in the arms. Plantar responses were extensor and tonus was slightly increased in the legs. After a 3 week rehabilitation program she was able to take a few steps with the aid of a walker and she is still on rehabilitation programme.

Cervical spondylotic myelopathy develops insidiously; coexisting diseases leading to disability may mask the symptoms and delay the diagnosis.

Keywords: Cervical, myelopathy, spondylosis

[P-008]

Psychosocial difficulties of patients with multiple sclerosis

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Objective: This study has two aims: to identify the most relevant psychosocial difficulties (PSDs) defined as impairments, activity limitations and participation restrictions, experienced by persons with multiple sclerosis (MS) and to describe PSDs onset and evolution in these patients.

Materials-Methods: 80 adult patients with MS (ICD-10: G35) were consecutively enrolled and interviewed by a trained psychologist at Neurological Institute Carlo Besta in Milan (Italy). The EU Project PARADISE Protocol (www.paradiseproject.eu) was used to collect information on PSDs associated to brain disorders.

Results: Mean age of patients was 41 years, 65% were women, 45% were married, 72.5% were working, 86.3% of the sample had a relapsing-remitting MS with a EDSS median score of 1.5 (IQR=1.0-2.5). Mean duration of the disease was 7.66 years (SD 6.94); mean duration of pharmacological treatment was 5.28 years (SD 5.19). More than half of the sample (58%) rated their health as good or very good, despite MS disease. Most frequently PSDs of MS patients were related to restlessness (81.2%), motor functions (sensory disturbance 56.3%; balance 58.7%; muscles strength 56.2%), emotional functions (being emotionally involved by the disease 76.3%; anxiety 73.8%; depressive symptoms 61.2% and coping functions 53.8%) and problems with sleeping (57.6%). Main determinants acting as moderate or strong facilitators were identified: medicines (75.7%) and cost of the medicines (61.0%), other health treatments (including rehabilitation ; 68.1%), assistive devices (62.2%), family assistance and help (76.3%), friends' attitudes (63.2%), health professionals' assistance (69.3%).

Conclusion: Despite clinical and sociodemographic differences between MS patients a common biopsychosocial and functional trend can be observed: PSDs mainly involve motor and emotional functioning. Free medicines, health treatments, family, friends and health professionals' assistance represent the most important facilitators. Attention to PSDs and their determinants, in addition to staging of signs and symptoms, can help clinicians to plan tailored and personalised rehabilitation programs.

Keywords: Multiple sclerosis, psychosocial difficulties, determinants, environmental factors

[P-009]

A prospective study of physical functioning in persons with multiple sclerosis

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Objective: The aim of this prospective 10-year follow-up study was to investigate changes in physical functioning in persons with multiple sclerosis (MS) in the Central Finland Health Care District.

Materials-Methods: The participants were obtained through an epidemiological survey in 2000. Out of 240 participants, the 10-year follow-up questionnaire was sent to 211 persons with MS and 181 (84%) answered. Performance in self-care, mobility and domestic life was assessed by the Functional Status Questionnaire (FSQfin, 0-100), walking without aids by the Walking Impairment Questionnaire (PAD, 0-100), and moving in own environment by the self-EDSS scale (1-5). Outcome measures were linked to the International Classification of Functioning, Disability, and Health (ICF).

Results: The mean age of the participants was 57 years (30-83 years) and time since diagnosis 20 years (10-52 years). Two third of them was women. The overall performance deteriorated statistically significantly ($p < 0.001$). The mean FSQfin deteriorated from 71 (SD 27) to 63 (SD 35) and the PAD from 58 (SD 41) to 47 (SD 45). Major change occurred in domestic life sub-scale. However, 57% of persons with MS were fully independent in domestic life against 64% in year 2000 and 46% could walk without aid against 59% in year 2000. The number of wheelchair users increased from 9% to 19% and bedridden participants from 1% to 5%.

Conclusion: The study demonstrated the progressive nature and heterogeneity of MS. Both performance in daily living and walking without aid deteriorated and the use of mobility aids increased over the 10-year follow-up period. However, over half of persons with MS could manage independently in daily life and walk without aid after mean disease duration of 20 years. Regular assessment of physical functioning is recommended in order to give exercise guidance, to assess needs of social benefits and to provide physiotherapy when needed.

Keywords: Multiple sclerosis, physical functioning, Functional Status Questionnaire

[P-012]

Relationship between functional status and quality of life associated with sleep disorder in multiple sclerosis

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Objective: Investigate the relationship between the sleep quality and functional status and quality of life in patients with multiple sclerosis.

Materials-Methods: The SF-36, the FIM and the Pittsburg Sleep Quality Index (PSQI) were used respectively in order to evaluate the quality of life for patients, to assess the functional status, to assess sleep quality.

Results: Sleep disturbance was detected in 12 patients (37.5%), and sleep disturbance was detected in 20 patients (62.5%) ($p > 0.05$). No difference was detected in terms of sociodemographic characteristics (age, gender, education and marital status, disease duration). No difference were observed between in Multiple sclerosis patients with or without poor sleep in terms of FIM mean, Beck depression scores, parameters of SF-36 sub-groups.

Conclusion: Age, gender, educational status, marital status, duration of disease does not affect the sleep disorder in patients with multiple sclerosis. The patient's functional status does not affect Sleep disorder. We concluded that the sleep disorder in these patients does not affect the quality of life.

Keywords: Multiple sclerosis, sleep disorders, quality of life

[P-011]

Relationship between functional status and quality of life associated with depression in multiple sclerosis

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Objective: To Investigate the relationship between the presence of depression and functional status and quality of life in patients with multiple sclerosis.

Materials-Methods: The SF-36, the FIM and the Beck Depression Scale were used respectively in order to evaluate the quality of life for patients, to assess the functional status, to assess depression.

Results: A total of 32 patients were included in the study, 15 men and 17 women. The average age of patients was 43.9 (SD 10.1, range 29-61), and mean disease duration was 12.9 (SD 5.4, range 3-27) years. There were 19 patients (59.4%) in depression and 13 (40.6%) not in depression. There were no significant differences between the two groups regarding gender, education and marital status. The average age of patients within the depression group was 47.7 (SD 10) years whereas in the non-depressed group it was 38.5 (SD 7.7) years, which is significantly lower. There were no significant differences between patients with and without depression comparing to the duration of disease and mean of FIM. Comparing to physical role, emotional role, bodily pain, general health, vitality, social function which are the sub-group parameters of the SF-36 quality of life scale, there was a difference between the two groups. It is meaningfully observed that averages for the group with depression was a statistically lower.

Conclusion: The average age of multiple sclerosis patients with depression show that advanced age is a risk factor for depression. Same FIM mean in both groups shows that the functional state does not affect the depression. Moreover, due to no difference between two groups regarding to the mean physical function which is a sub-groups of the SF-36, the functional state does not affect the depression. The lower average of other SF-36 scores (PR, ER, BP, GH, SF, vitality) shows that depression adversely affect the quality of life.

Keywords: Multiple sclerosis, functional status, depression

[P-013]

A case of multiple sclerosis with common plaque with only dysesthesia symptoms

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Multiple sclerosis (MS) lesions can occur in different parts of the central nervous system and therefore cause a variety of symptoms and signs. In the presented case the patient received a diagnosis of MS without finding anything other than dysesthesia and subsequently changed into a very different clinical picture of musculoskeletal symptomatology of MS, so would like to draw attention to an insidious course of MS.

A 22-year-old female patient visited the physical therapy clinic complaining of dysesthesia for the last month in the right arm. All examinations of the outside of the left arm showed common dysesthesia; cranial nerve, superficial and deep sensory, motor, deep tendon reflex and pathological reflexes examination were normal. There was no resume and family history. Neck x-ray was normal. But magnetic resonance imaging (MRI) in the spinal cord showed C2-3 and C3-4 level hyper-intense signal in the T2 sequence and also in the brain in the left centrum semiovale hypo-intense signal in T1, hyper-intense signal in T2 section, and after IV of Gad, in the bilateral centrum semiovale and periventricular white matter enhancing rim millimeter-sized demyelinating plaques were observed. In CSF oligoclonal bands tended to be positive, IgG index was 0.98. Routine blood tests were normal. Antinuclear antibody, anti-dsDNA, anticardiolipin and antiphospholipid antibodies, lupus anticoagulant, protein C, protein S, anti-thrombin III antibody levels, vitamin B12 and folic acid levels, thyroid function tests, tumor markers and hepatitis, anti-HIV, syphilis, brucella agglutination tests and lyme test were normal. Pathergy test was negative. Chest X-ray, computed tomography of the thorax and the abdomen, electrocardiography, echocardiography, carotid-vertebral Doppler ultrasound examinations were normal. After evaluating the case with neurological, clinical, radiological and laboratory data were evaluated by the MS after the exclusion of other etiology. 1000 mg/day dose intravenous methylprednisolone was given for 5 days.

The diagnosis of MS is easy if classic symptoms are present, but an atypical course is difficult to diagnose. In our case there was no finding beside dysesthesia of the left arm but we observed demyelinating plaques in MRI. This demonstrates how wide the variety of signs and symptoms within the scope of physical therapy clinics can be and how differently they may indicate an underlying disease.

Keywords: Multiple sclerosis, dysesthesia, difficult diagnosis

[P-014]

The risk factors and prevalence of upper extremity impairments and an analysis of effects of lymphedema with other impairments on the quality of life of breast cancer patients

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Objective: To determine the prevalence and identify the risk factors associated with upper extremity impairments (UEIs) in breast cancer patients and to investigate the degree to which these impairments along with lymphedema and other clinical and demographic characteristics influence quality of life (QoL).

Materials-Methods: A total of 201 women over the age of 18 who underwent breast cancer treatment more than six months were included in this cross-sectional study. The sociodemographic characteristics of all of the patients were recorded, and they were then evaluated for the presence of UEIs. These were divided into five subgroups: pain, restriction of shoulder range of motion (ROM), numbness and heaviness, loss of strength, and sensory deficit. The patients were determined to have lymphedema using a circumferential measurement method, and the QoL of the patients was evaluated by the Medical Outcomes Study 36-item Short-Form Health Survey.

Results: The mean age of the patients was 52.5 (SD 10.4), and the mean follow-up period was 47.9 (SD 48.7) months. The prevalence of the upper extremity impairments was as follows: pain 31.8%, restriction of shoulder ROM 23.9%, numbness and heaviness 35.3%, loss of strength 8.5%, and sensory deficit 18.4%. Furthermore, lymphedema was seen in 41.3% of patients. A univariate analysis was initially conducted, then followed by a multivariate analysis. The multivariate model showed that lymphedema is the only statistically significant risk factor that affects the development of UEIs ($p = 0.001$). However, it also revealed that lymphedema ($p = 0.001$) and advanced age negatively affect QoL, whereas prolongation of the follow-up period has a favorable impact ($p = 0.016$).

Conclusion: We determined that UEIs have no statistically significant impact on QoL. Lymphedema is a major risk factor for the development of UEIs and it also impairs the QoL of breast cancer patients. Therefore, untreatable, established lymphedema diminishes QoL via an increased number of UEIs.

Keywords: Breast cancer, upper extremity impairments, prevalence, lymphedema, quality of life

[P-017]

Functional outcome after kinesiotherapy in patient with hemiarthroplasty of the shoulder

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Objective: Shoulder hemiarthroplasty is a shoulder replacement in which the broken humeral head is replaced with an artificial. Rehabilitation involves kinesiotherapy (in the first 3 weeks: pendulum, passive, self-assisted isometric exercises and active exercises for the elbow and wrist; abduction and outer rotation are not allowed in this period; after 3 weeks: active and supportive active exercises in all directions; after 6 weeks: active exercises with the workload) occupational therapy, hydrotherapy, electrotherapy, magnetic therapy and laser therapy. The aims of kinesiotherapy are to maintain the physiological length of the muscle, to restore normal shoulder joint mobility, to increase muscle strength, improve circulation, stimulate healing tuberculum and soft tissue, reducing pain and inflammation. The objective was of our study to evaluate the functional outcome after exercise in patient with hemiarthroplasty of the shoulder.

Materials-Methods: Eleven patients underwent the kinesiotherapy after the hemiarthroplasty of the shoulder. We evaluate the range of active movements, muscular strength with emphasis on rotator cuff muscle and Neers score before and after physical therapy. Average duration of physiotherapy was 4 months (1.5 -8 months). Physical treatment was started after 2 weeks from surgery in three patients. Average time of beginning physical therapy was 3 days in other patients.

Results: The mean age was 68 years of our 11 patients. Comorbidity was representing in ten patients. The range of active movements was widened in all directions in the shoulder – especially the abduction. The average strength of shoulder muscles were higher for 1 mark, regarding to manual muscle test, especially for muscles of rotator cuff. Neer's score was higher for 40 points. All patients achieved independence in activities of daily living. One patient returned to work.

Conclusion: Early start of adequate physical therapy and cooperation of a surgeon and a physiatrist are of a paramount importance for the excellent functional outcomes.

Keywords: Functional outcome, shoulder hemiarthroplasty, kinesiotherapy

[P-015]

Comparison of physiotherapy and home-based exercises in the conservative treatment of rotator cuff tears

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Objective: To evaluate the outcome of physiotherapy performed by physiotherapists, compared to home-based exercises in the conservative treatment of patients with full thickness rotator cuff tears.

Materials-Methods: A prospective randomized controlled pilot study was conducted. Three centers for orthopedic surgery participated. 43 adult subjects (age range 18-75 years) with a full thickness rupture of the rotator cuff which was verified by magnetic imaging tomography, with clinical signs of a chronic rotator cuff impingement were recruited. After drop-out, 38 patients were available for full examination. The patients were randomized to physiotherapy or to independent home-based exercises twice a day using a booklet. Before therapy and after two months of conservative treatment, pain intensity, the Constant-Murley score, isokinetic strength testing in abduction and external rotation, functional limitation, clinical shoulder tests and health-related quality of life (EQ-5D) were evaluated.

Results: Two-thirds of the patients improved in clinical shoulder tests, regardless of the therapy group. There were no significant differences between the groups with reference to pain, range of motion, maximum peak force (abduction, external rotation), the Constant-Murley score, and the EQ-5D index. The only significant difference observed was the improvement in the self-assessed health-related quality of life (EQ-5D VAS) favoring home-based exercises.

Conclusion: It is concluded that home-based exercises, on the basis of an illustrated booklet with exercises, supplies comparable results to formal physiotherapy applied by physiotherapists in the conservative treatment of rotator cuff tears. The results of this study suggest some potential advantages related to psychological benefits using home-based treatment.

Keywords: Physiotherapy, home exercise, rotator cuff

[P-018]

Acute ankle sprain work-related injury: A new approach to the rehabilitation program

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Objective: The incidence acute ankle sprain has been estimated to be between 60.9 and 70 per 10,000 individuals. The conventional conservative treatment according to the degree of injury requires a prolonged immobilization period. Accelerated conservative treatment has been proved to yield satisfactory functional outcome without higher incidence of recurrences in athletes. To our best knowledge its efficiency in worker-compensation patients has not been evaluated. Our objective was to assess two conservative ankle sprain treatment modalities (conventional versus accelerated) by comparing a prospective cohort of patients treated with an accelerated protocol to a retrospective cohort treated conventionally during 2008-2011.

Materials-Methods: A retrospective cohort of 38 patients with the diagnosis of acute ankle sprain with different degree of injury (GI, GII, GIII) were selected. Inclusion criteria were days off work, conventional treatment, fracture ruled out according to the Ottawa rules, and requirement of physical therapy. Patients with associated traumatic injuries, without work leave and not requiring physical therapy were excluded. A prospective 20-patient cohort was then enrolled with the same inclusion and exclusion criteria. After the patient's consent, an accelerated treatment with a semi-rigid ankle orthosis, rest during the first 6 hours, and progressive-loading rigid brace and the use of treatment stress to determine the degree of injury (GI, GII, GIIIB or GIIIA depending on whether or not significant yawn was present) was applied. The rehabilitation protocol was defined in four phases with objective criteria for progression to high labor at work. Statistical analysis was performed to compare the two groups.

Results: The two groups were homogeneous in age, sex and degree of injury ($p > 0.05$). Clearly significant differences in days off work (mean 38.5 in the conventional treatment group vs. 17.1 in the accelerated treatment group) and length of follow up at discharge (mean 46.1 vs. 21.2) were found.

Conclusion: Accelerated treatment in working-compensation patients with acute ankle sprain related injury is useful and significantly shortens the days off work.

Keywords: Ankle sprain, work-related injury, physical therapy

[P-020]

The profile of patients with lower limb amputation – A preliminary study

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Objective: The aim of this study was to assess clinical characteristics of patients with lower limb amputation and also to investigate the effects of prosthesis on daily living activities.

Materials-Methods: We collected data (demographical characteristics, preferences regarding prosthesis) of 198 patients admitted to hospital with lower-limb amputation. K-level descriptors was used to determine the patients functional level. Nottingham Extended Activities of Daily Living Scale (NEADLS) was used to assess the effect of prosthesis on daily living activities.

Results: Patients mean age was 36.9 (SD 12.4) years; 13.1% of the patients were women, 86.9% were men; 29.8% of the patients were working whereas 70.2% were not actively working. Amputation levels were transfemoral (50.5%), transtibial (38.4%), knee disarticulation (9.1%), and hip disarticulation (2%). Reasons of the extremity amputations were trauma (72.2%), malignancy (10.1%), congenital abnormalities (5.6%), peripheral vascular disease (5.1%), infection (4.5%), and diabetes mellitus (2.5%). Traumatic causes were traffic accidents (51.7%), work accidents (19.6%), gunshot wounds (9.8%), train crash (9.1%), the explosion of mines (4.2%), electric shock (3.5%), and earthquake (2.1%). The average duration of amputation was 12.9 (SD 9.8) years. 3.5% of patients had K2, 16.7% of patients had K3, 79.8% of patients had K4 activity level. 63.1% of the patients used microprocessor-controlled swing stance phase, 31.8% of the patients used active vacuum system, 2% of the patients used classical mechanics modular orthotics, 3% of the patients silicon linear pin orthotic system. The average of NEADLS was 46.8 (SD 11.2) before the prosthesis, and 56.9 (SD 8.6) after the prosthesis. The difference was statistically significant ($p < 0.001$).

Conclusion: This study showed the distribution of prosthesis used in patients with lower limb amputees and the positive effects of prosthesis on daily living activities.

Keywords: Profile, lower limb, amputation

[P-022]

Effect of educational programs for prevention of osteoporosis on the knowledge of high-school students in Tehran, Iran

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Objective: Osteoporosis is a disease that is characterized by reduced bone mass causing bones to weaken and break easily. It is a silent epidemic of our times that mostly affects women, who therefore need education and awareness about osteoporosis. An effective preventative measure is to strengthen bones in childhood and adolescence. We investigated the effectiveness of an educational program for prevention of osteoporosis aimed at the knowledge of high-school students in Tehran.

Materials-Methods: This study was conducted in two sessions with a questionnaire consisting of three parts: A – demographics; B – questions about the participants' knowledge; C – the methods of using the educational information. A quasi-experimental design (test before and after the educational program) with a control group was used. 600 female students participated in two groups (educational and control) of size 300. The questions addressed the explanation of the disease and the prevention measures, i.e., diet (use of calcium), physical exercise and exposure to sun light (for vitamin D).

Results: The data before and after the educational program were compared. The knowledge and the practice of the two groups after the intervention were statistically significantly different ($p < 0.001$).

Conclusion: Various risk factors for osteoporosis are known, including nutrition (lacking calcium) and not having appropriate daily physical activities. One of the most important strategies for osteoporosis prevention is young women having a strong skeleton. Stronger efforts are needed to promote osteoporosis prevention-related behavior for women.

Keywords: Education, prevention, osteoporosis

[P-021]

The efficiency of the different physical treatment modalities for knee contracture

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Objective: In this study we aimed to compare the efficiency of different physical therapy and rehabilitation programs for traumatic knee contractures regarding range of motion. Additionally, we aimed to define the psychological and functional status of the knee contracture patients.

Materials-Methods: The study included 36 traumatic knee contracture patients. The patients were categorized into four treatment groups: stretching only, stretching with whirlpool therapy, stretching with ultrasound therapy and stretching with whirlpool and ultrasound therapy. The treatment was applied 5 days a week for a total of 20 sessions. Range of motion (ROM) assessment, Short Form-36 (SF-36) and Beck Depression Scale (BDS) were administered before treatment, after treatment, one month after the end of the treatment and three months after the treatment.

Results: The four groups were similar regarding age, sex and body mass index ($p > 0.05$). There was a statistically significant increase of ROM in all the groups ($p < 0.05$) while there were no statistically significant differences between the groups. BDS showed a decrease in depression frequency in all the groups, but again, no statistically significant differences between the groups were detected ($p > 0.05$). The follow-up assessment showed an improvement on the physical function, physical capacity and pain dimensions of the SF-36 ($p < 0.05$).

Conclusion: Physical treatment programs for knee contracture patients are efficient in terms of ROM, depression and functional status. No difference was detected between different treatment modalities.

Keywords: Knee contracture, range of motion, functional status

[P-023]

Bone mineral density due to immobilization after upper extremity injuries

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Objective: We investigated the causes of bone loss in immobilization, whether due to local or systemic factors.

Materials-Methods: Fifty patients with upper extremity tissue injury were included in the study. Each patient's bone mineral density was evaluated in all extremities in the first month of injury and 3 months after the first evaluation by dual-energy X-ray absorptiometry (DEXA).

Results: There was a statistically significant increase in the midradius and total radius bone mineral density measurements in the uninjured extremity ($p < 0.05$). At the three-month follow-up there was a statistically significant increase in the injured extremity midradius bone mineral density value of the patients with less than four-week immobilization ($p < 0.05$).

Conclusion: There was no significant decrease in bone mineral density due to immobilization in this study. There was an increase in bone mineral density of the contralateral extremity. This suggests that changes in bone mineral density are mainly due to local factors rather than systemic factors.

Keywords: Upper extremity injury, immobilization, bone mineral density

[P-024]

Comparison of bone mineral density levels in smokeless tobacco users and smokers in healthy men

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Objective: Smoking and smokeless tobacco use are two recognized risk factors for low bone mineral density (BMD) and osteoporosis. Maras powder (MP), a kind of smokeless tobacco, has a lot of addicts in the city of Kahramanmaraş and its surroundings, Turkey. This is the first study investigating the effects of MP on BMD and comparing with smoking.

Materials-Methods: A total of 120 healthy male subjects (60 MP users, 60 smokers) from Maras City, Turkey were included in the study. All subjects information on demographics, health history, alcohol and tobacco use and medication use were obtained by an interviewer-administered questionnaire. Subjects who had any pathology that might affect BMD, were excluded from the study. Measurements of bone mineral density were obtained by phalangeal radiographic absorptiometry of the nondominant hand. BMD values (g/cm²) of MP users were compared with those of smokers.

Results: The mean duration of MP use and the mean age of MP users were 30.6 (SD 14.4) years and 64.4 (SD 9.8) years, respectively. The mean duration of smoking and the mean age of smokers were 33.7 (SD 11.0) years and 61.6 (SD 10.4) years, respectively. The mean phalangeal BMD in MP users (0.31 g/cm², SD 0.04) was significantly lower than that in the smokers (0.33 g/cm², SD 0.03; p = 0.004).

Conclusion: In MP user males, BMD is lower compared to the smoker males. If our results are supported by other studies, it may be claimed that MP use is a very strong risk factor for low BMD value compared to cigarette smoking.

Keywords: Maras powder, smokeless tobacco, smoking, phalangeal radiographic absorptiometry, bone mineral density

[P-025]

The effect of using smokeless tobacco on the parameters of bone turnover, vitamin D and melatonin levels

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Objective: Maras powder (MP) is known as a type of smokeless tobacco, in the southeastern Turkey, many are addicted to. This study, the effect of the use of MP on the parameters of bone turnover, vitamin D and melatonin levels were biochemically investigated.

Materials-Methods: Seventyone (39 MP user, 32 nonuser) voluntary male were included. The cycle of bone turnover in the body, vitamin D levels and any pathologies that affect the level of oxidant-antioxidant status were excluded. Total vitamin D values in the blood, melatonin and osteocalcin values in the serum and deoxypyridinoline value in the urine were measured.

Results: The mean age in the study group was 44.1 (SD 4.6) years, in the control group it was 46.5 (SD 8.43) years (p > 0.05). The mean laboratory values of the study group were: deoxypyridinoline 6.93 (SD 2.50) nM/mM creatinine, osteocalcin 3.80 (SD 2.45) ngr/ml, vitamin D 11.83 (SD 4.00) ng/ml, and melatonin 17.98 (SD 10.20) pg/ml. The mean values for the control group were: deoxypyridinoline 6.01 (SD 1.94) nM/mM creatinine, osteocalcin 2.43 (SD 0.87) ngr/ml, vitamin D 16.78 (SD 4.31) ng/ml, and melatonin 9.88 (SD 3.38) pg/ml. It was found that osteocalcin and melatonin levels were higher and vitamin D levels were lower in the study group. The difference between the groups was statistically significant (p < 0.05).

Conclusion: For the men using MP, melatonin and products of the bone resorption levels are increased. Increase in bone resorption products indicates that the use of MP might be considered as a risk factor for the development of systemic osteoporosis. Increase of melatonin levels in the users of MP compare to control group, suggests that antioxidant defense system against oxidative stress has been activated in the body.

Keywords: Maras powder, smokeless tobacco, melatonin, osteocalcin, deoxypyridinoline

[P-026]

Evaluation of bone mineral density in children with thalassemia major

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Objective: Brittle and thin bones result from various factors in thalassemia patients. Even with the best treatment plan, significant osteoporosis develops contributing in morbidity in most of the thalassemia major (TM) patients. The aim of this study was to evaluate bone health of thalassemic children with biochemical parameters and bone mineral density (BMD), and to emphasize the importance of precautionary measures and early diagnosis of osteoporosis.

Materials-Methods: The study consisted of 13 children with TM (5 females, 8 males, age <18 years). Age, duration, weight, height, transfusion frequency, use of chelating agents and other medications were recorded. The following laboratory analysis were obtained: Whole blood count, fasting blood glucose, ferritin, alanine aminotransferase, aspartate aminotransferase, calcium, phosphorus, alkaline phosphatase, thyroid stimulating hormone, free thyroxin, and intact parathyroid hormone (iPTH). BMD was measured from femur and lumbar vertebrae using dual energy x-ray absorptiometry (DEXA). Osteoporosis was defined as DXA Z-score < -2.

Results: The mean age was 7.8 (SD 3.2) years and mean body mass index was 14.7 (SD 1.9) kg/m². Mean lumbar BMD was 0.464 (SD 0.108) gr/cm²; mean total femur BMD was 0.580 (SD 0.114) gr/cm²; mean lumbar DEXA Z-score was 2.44 (SD 1.60); mean total femur DEXA was -0.93 (SD 1.19). Osteoporosis ratio was 69% in lumbar vertebrae and 10% in femur. There was a significant positive correlation between lumbar and femoral BMD and a negative correlation between femoral BMD and iPTH.

Conclusion: BMD is decreased in thalassemic children and despite regular transfusion and chelating agent therapy, osteoporosis starts at a very early age.

Keywords: Thalassemia major, bone mineral density, osteoporosis

[P-027]

Measurement of bone mineral density in male detainees

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Objective: We aimed to investigate the increased risk for osteoporosis due to closed environment and sedentary lifestyle of prisoners. In this way, we planned to inform prisoners and supervisors for protective measures that should be taken if low bone mineral density (BMD) is detected compared with normal population.

Materials-Methods: Sixty-six male prisoners over the age of 45 as the study group and 66 male volunteers who are not detainees over the age of 45 as a control group were included in the study. All participants' age, occupation, duration in prison, habits, diseases and medications used were noted. BMD values were measured using a phalangeal radiographic absorptiometry (Alara Metriscan®) from the non-dominant hand.

Results: BMD values in the study group were (mean (SD)) 0.341 (0.030) g/cm² and 0.346 (0.029) g/cm² in the control group (p = 0.968).

Conclusion: In this study, we found that BMD values of the detainees were lower than those of the control group but this difference was not statistically significant. However, there was a negative correlation between BMD values and duration of imprisonment.

Keywords: Bone mineral density, prison, risk factors, osteoporosis

[P-028]

Case report: Presentation of two siblings with homocystinuria-induced osteoporosis

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Objective: Osteoporosis may result from an imbalance in the anabolism-catabolism equilibrium of bone and the impairment in the bone matrix, which involves bone microstructure and connective tissue. Homocystinuria is a hereditary metabolic disorder, which is caused by enzymatic defect of methionine metabolism, and can lead to marfanoid phenotype and various bone deformities. It is one of the etiological factors of the early secondary osteoporosis. Homocystinuria can be diagnosed with demonstration of increased plasma methionine and homocystein levels and an increase in the urinary excretion of homocystein.

Materials-Methods: We present a case report of two adult siblings with Marfan syndrome and osteoporosis who presented with back pain to our clinic.

Results: The physical examination revealed mental retardation, eye abnormalities (history of previous operation due to lens subluxation, myopia), and kyphoscoliosis. The first case also had history of epilepsy, and superior sagittal sinus thrombosis. The first case was diagnosed with severe osteoporosis with vertebrae fractures and the second case had osteopenia (bone mineral density Z scores of lumbar vertebrae measured by dual X-ray absorptiometry were -3.8 and -1.7, respectively). Homocystein levels of the cases were 359 Umol/L and 333 Umol/L; methionine level of the first case was 39.65 nmol/ml and both of them were consistent with severe homocystinemia. As a result of medical history, physical examination and laboratory findings, these two siblings were diagnosed with classical homocystinuria.

Conclusion: Metabolic disorders affecting bone metabolism such as homocystinuria should be considered in the differential diagnosis of early-onset osteoporosis.

Keywords: Homocystinuria, osteoporosis, methionine

[P-030]

The utility of quantitative ultrasound for evaluating bone status in men

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Objective: The aim of this study was to investigate whether quantitative ultrasound (QUS) systems could successfully identify men with osteoporosis or bone mineral density (BMD) below the expected range for age as measured by dual-energy X-ray absorptiometry (DXA).

Materials-Methods: BMD at the lumbar spine and hip was measured in 105 men aged between 24 and 85 years using DXA. Osteoporosis at the lumbar spine (L1-L4 vertebrae) and hip (neck of the femur, total hip) was defined according to the WHO criteria (T-score ≤ -2.5) in men aged ≥ 50 years. Z-scores of ≤ -2.0 were used for defining osteoporosis or BMD below the expected range for age in those < 50 years. Acoustic parameters of bone were also obtained using a calcaneal QUS device [quantitative ultrasound index (QUI), broadband ultrasound attenuation (BUA), and speed of sound (SOS)] as well as a multi-site QUS (radial and tibial SOS) in the study participants.

Results: The QUS variables which showed significant correlation with DXA BMD measurements in all regions of interest (ROI) considered were QUI and SOS, but not BUA, as measured by calcaneal QUS at the left heel. Neither left radial nor tibial SOS as measured using the multi-site QUS showed a significant correlation with DXA BMD in any ROI. The areas under the receiver operating characteristic curves (AUCs) ranging from 0.455 (for left radial SOS) to 0.646 (for left heel SOS) did not reach a level of significance (p values between 0.65 and 0.56) for any QUS variable for predicting osteoporosis or BMD below the expected range in men studied.

Conclusion: Lack of sufficient correlations between QUS parameters and DXA BMD measurements and poor or failing AUCs in the sample studied do not allow us to comment on the utility of QUS for evaluating bone status for the prediction of osteoporosis in men.

Keywords: Osteoporosis, quantitative ultrasound, bone mineral density, men

[P-029]

The osteoporotic effect of arteriovenous fistula on the ipsilateral upper extremity in hemodialysis patients

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Objective: Hemodialysis requires an arteriovenous fistula (AVF), the presence of which may influence the structure of nearby bone. This study analyzed the effect of AVF on ipsilateral upper extremity bone mineral density (BMD), as measured by phalangeal radiographic absorptiometry (RA).

Materials-Methods: In this cross-sectional study, phalangeal BMD was measured in both arms by RA in a convenience sample of end-stage renal disease patients with a forearm AVF. Patients were excluded if the patient had pathology which might affect distal arm circulation. BMD values (g/cm²) from forearms with AVF were compared to values from forearms without AVF. All patients had pre-dialysis complete blood count, calcium, phosphorus, alkaline phosphatase, parathyroid hormone, urea, creatinine, potassium, albumin, total cholesterol, HDL cholesterol, and LDL cholesterol values measured; dialysis adequacy values were also calculated.

Results: One hundred sixteen patients agreed to participate in the study. Thirty-three patients were excluded, thus data was analyzed from 83 patients: 59% male, 41% female, mean hemodialysis time of 156 (SD 6) months and mean age of 53 (SD 16) years old. AVFs were located in the nondominant hand in all patients. Phalangeal BMD in forearms with AVF (mean 0.28, SD 0.05 gr/cm², range 0.14-0.40) was significantly lower than that in the contralateral forearm (mean 0.30, SD 0.04 gr/cm², range 0.19-0.40, p < 0.05).

Conclusion: In ESRD patients on hemodialysis, BMD is lower in the ipsilateral-to-AVF hand compared to the contralateral-to-AVF hand. In these patients, further investigations should be made to ascertain the ability of BMD values to determine fracture risk and to prompt physicians to initiate treatments which will preserve BMD and reduce fractures.

Keywords: Osteoporosis, bone mineral density, phalangeal radiographic absorptiometry, arteriovenous fistula

[P-031]

Cortical stress reaction on oral bisphosphonate therapy in two patients: Case report

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Bisphosphonates (BFS) are widely used and effective medication of documented osteoporosis. They accumulate in bone and are released for months or years after the treatment had been stopped. Low-energy subtrochanteric stress fractures of the femur affecting patients on BFS therapy have been described since 2005. These fractures are often preceded by pain in thigh and radiologically presented with lateral cortical thickening of femur that leads to an atypical fracture pattern. Contralateral femur cortical stress reaction (CSR) may also be observed in plain radiographs. We present two female patients on oral BFS therapy complaining of thigh pain and difficulty in walking. The first patient was 78 years old and had been on calcitonin therapy for 2 years and alendronate, ibandronate for 3 years. CSR was seen in both femoral shafts. MRI imaging was done to rule out bone tumor. The second patient was 61 years old and had been using alendronate for 2 years. CSR was seen in plain radiographs and CT. They were informed about the problem. We advised them to rest, walk with crutches, have physical therapy, avoid trauma, take medication for pain relief, and calcium and vitamin D supplementation besides changing the medication. Early diagnosis of CSR would be important to plan appropriate treatment.

Keywords: Bisphosphonates, cortical stress reaction, osteoporosis

[P-033]

Demografical data, risk factors and clinical findings in osteoporosis

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Objective: To compare demographic properties and osteoporosis risk factors in the patients with and without osteoporosis and to analyse the clinical findings.

Materials-Methods: 127 patients with postmenopausal-senile osteoporosis and 53 non-osteoporotic volunteers were included. The subjects were examined in terms of age, body mass index (BMI), risk factors like drinking milk, age at menopause, history of breast-feeding, exercising, fracture history, existence of vertebral compression fracture, and fracture mechanism. They underwent full physical examination, static and dynamic balance tests.

Results: The mean age was statistically higher and the mean BMI level was statistically lower in the patients ($p < 0.05$). The mean menopause age was significantly lower, and the breast-feeding period equal or more than 12 months was significantly higher in the patients ($p < 0.05$). There was no significant difference between groups in terms of milk consumption and exercise behavior ($p > 0.05$). Serum osteocalcin levels and fracture rates of the patients were higher than the control subjects ($p < 0.05$). Vertebral compression fracture rate in the patients was 22.8%, there was no control subject with vertebral compression fracture. Although the occurrence of the fracture with mild impact was higher in the patients, this difference was statistically insignificant ($p > 0.05$). The patients had significantly higher paravertebral spasm, back pain, low back pain, and thoracic kyphosis levels and higher number of errors in the dynamic balance test ($p < 0.05$).

Conclusion: The fractures with mild traumas and the number of dynamic balance errors which might be important in fracture occurrence were higher in the patients with postmenopausal-senile osteoporosis. Finding the risk factors leading to osteoporosis, taking necessary measures, and increasing the consciousness can decrease the morbidity and mortality rate of fractures.

Keywords: Balance test, body mass index, osteoporosis, fracture, serum osteocalcin

[P-036]

Mean platelet volume in patients with fibromyalgia

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Objective: Fibromyalgia is a syndrome characterized by chronic widespread pain at multiple tender points, joint stiffness, and systemic symptoms. The etiology and pathogenesis of fibromyalgia remain still unclear, although many factors are accused. The aim of this study is to evaluate levels of mean platelet volume (MPV) in patients with fibromyalgia. Mean platelet volume (MPV), which is a determinant of platelet activation, is a newly emerging independent risk factor for cardiovascular disease.

Materials-Methods: The present study is designed to evaluate levels of MPV in patients with fibromyalgia compared with healthy subjects. The study population grouped as 283 patients with fibromyalgia and 72 healthy controls. Erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), white blood cell count (WBC), platelet count (PLT), and MPV levels were retrospectively recorded from the computerized patient database.

Results: The levels of MPV were significantly higher in the fibromyalgia group than in the control group (mean 8.09, SD 0.84 vs. mean 7.73, SD 0.65; $p < 0.001$). There were no statistical difference regarding platelet count and other parameters between groups.

Conclusion: These results suggest that an early atherosclerosis marker, MPV, is elevated in patients with fibromyalgia. This points to increased platelet activation and therefore a higher risk of future cardiovascular disease.

Keywords: Fibromyalgia, platelets, volume

[P-035]

The neuropathic component of chronic low back pain

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Objective: The aims of this study were to determine the frequency of neuropathic pain with chronic low back pain, factors related to neuropathic pain, the relationship between the depression and physical disability.

Materials-Methods: One hundred eight patients with chronic low back pain who came to Erzurum Region Education and Research Hospital, out-patient clinic of Physical Medicine and Rehabilitation Department were included in the study. Patients answered questions in forms that include sociodemographic properties of them. Neuropathic pain diagnostic questionnaire (DN4), Beck Depression Inventory (BDI) and Roland-Morris Disability (RMD) questionnaires were used to assess the neuropathic pain, the depression, and the physical disability, respectively.

Results: The average age of patients was 44.5 (SD 13.9) years. Forty two patients (38.9%) had a neuropathic pain component. Neuropathic pain and Body-mass index (BMI) were positively correlated ($r = 0.237$, $p = 0.013$). In women, the presence of neuropathic pain component was significantly higher than men ($p = 0.003$). Also, in the presence of neuropathic pain was found to increase with higher physical disability ($p < 0.001$). There was a positive correlation between depression and neuropathic pain ($r = 0.398$, $p < 0.001$). The rate of depression in women compare to men was significantly high ($p = 0.007$). There was a positive correlation between disability and depression ($p < 0.001$).

Conclusion: Usually, nociceptive pain is dominant in the acute phase of low back pain. If it is unable to adequately control the nociceptive pain, pain may become chronic and neuropathic pain can become dominant component. Management of chronic low back pain, consideration of neuropathic pain component will increase the success of treatment.

Keywords: Chronic pain, low-back pain, neuropathic pain

[P-037]

Nurses' knowledge of neuropathic pain

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Objective: The aim of our study was to determine the levels of information and awareness of the nurses who work in the physical medicine and rehabilitation, neurology, and neurosurgery departments on neuropathic pain.

Materials-Methods: As 20 from each department, total 60 nurses working in the physical medicine and rehabilitation, neurology and neurosurgery departments of Beyhekim State Hospital of Konya in Turkey took part in the study. The information and awareness levels of nurses on neuropathic pain were assessed via a questionnaire prepared by specialists in light of recent literature. The questionnaire was composed of 30 questions including the definition, symptoms, treatment and management of neuropathic pain.

Results: None of 60 nurses participating in the study had been given any in-service training about neuropathic pain previously. According to the assessments, 80% of the nurses (48) were found not to have sufficient knowledge about the definition of neuropathic pain; 83.3% (50) about the diseases causing neuropathic pain; 83.3% (50) about the symptoms of neuropathic pain; and, 90% (54) about the management of neuropathic pain. The findings obtained from the nurses of three different departments showed no statistically significant association.

Conclusion: Our findings indicated that the participants working in three different departments were seriously lack of information about neuropathic pain. Informing nurses about neuropathic pain during in-service training will be an important step towards improving the quality of services provided.

Keywords: Nurses, neuropathic pain, pain, knowledge

[P-038]

Presence of neuropathic pain in knee osteoarthritis

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Objective: The objective of our study was to investigate the presence of neuropathic pain in patients with knee osteoarthritis

Materials-Methods: Ninety-seven patients under follow-up for knee arthritis were included in our study. Physical examination and knee examination were performed on the patients. Chronic diseases causing neuropathic pain were excluded. Functional and pain assessment for the patients were made using WOMAC. Presence of the neuropathic pain was assessed using LANSS (Leeds Assessment of Neuropathic Symptoms and Signs Pain Scale) and DN4 neuropathic pain scale.

Results: 16 patients out of the 97 included in the study were males (16.5%), and 81 were females (83.5%). The mean age was 58.9 (SD 10.1) and the mean body mass index was 31.5 (SD 6.9). Statistically significant straight correlation was found between the sub-scale and total scores of WOMAC and DN4 ($p < 0.001$). Statistically significant straight correlation was also found between the sub-scale and total scores of WOMAC and LANSS ($p < 0.001$). Statistically significant straight correlation was also found between DN4 and LANSS ($p < 0.001$) Statistically significant correlation was not found between BMI and either DN4 or LANSS ($p > 0.05$). DN4 levels increased with the increasing duration of symptoms and nighttime pain ($p < 0.001$). LANSS levels also increased with the increasing duration of symptoms and nighttime pain ($p < 0.01$).

Conclusion: Our study showed that neuropathic pain accompanied the chronic knee pain. Patients with knee osteoarthritis should be treated and followed for neuropathic pain.

Keywords: knee osteoarthritis, neuropathic pain, Leeds Assessment of Neuropathic Symptoms and Signs Pain Scale

[P-041]

Fracture history in osteoporosis: Risk factors and its effect on quality of life

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Objective: Osteoporosis is a silent disease until first fracture occurs so patient recognition is the greatest clinical challenge. Most of the impact of osteoporosis on quality of life relates to fracture. Although major fractures can be clinically detectable, subclinical vertebral fractures are asymptomatic. With the aid of Quality of Life assessment tools, we can detect how OP related problems effect the patients' health status.

Materials-Methods: The purpose of this study was to determine the effect of major fracture history on Quality of life. We also search for important risk factors and look for their effect on bone mineral density and fracture history. We recruited 86 patients who admitted to Osteoporosis Clinics in the Department of Physical Medicine and Rehabilitation between July-August 2013. Clinical characteristics, systemic disease, chronic drug usage, family history were examined. Calcium intake of the patients was assessed using the European Vertebral Osteoporosis Study (EVOS) Questionnaire and the physical activity level was evaluated. Lumbar vertebra and proximal femur bone mineral density (BMD) were measured by dual energy X-ray absorptiometry DXA. In order to determine the secondary causes of osteoporosis, biochemical tests were investigated. QUALEFFO- 41 questionnaire was also used for evaluating Quality of Life.

Results: The average age of 86 patients included in the study was 56.77±13.03 and 89% of them were postmenopausal women. The average body mass index (BMI) was 26.42±6.03 which means overweight. 52.6% patients were diagnosed osteoporosis and 46.4% osteopenia. 30 patients had a fracture history with minor trauma. There were 10 ankle and foot, 9 forearm, 6 vertebral, 4 hand, 3 hip, 1 tibial, 1 rib fracture history as some of the patients had more than one fracture. When the patients with and without fracture history were compared, the mean QUALEFFO score in patients with fracture were 49.52 and in non-fracture were 40.28.

Conclusion: Forearm, ankle and foot fractures are common in OP patients with fracture history. We suggest that it is important to recognize OP prior to fracture and specific Quality of Life assessment should be done.

Keywords: Osteoporosis, fractures, quality of life, risk factors

[P-042]

Psychosocial difficulties of patients with Parkinson disease

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Objective: This study aimed to identify and describe psychosocial difficulties (PSDs) that patients with Parkinson Disease (PD) experience in their everyday life. PSDs are defined as impairments, activity limitations, participation restrictions and environmental factors.

Materials-Methods: 80 adult patients with PD (ICD-10: G20) were consecutively enrolled and interviewed using the EU Project PARADISE Protocol (www.paradiseproject.eu) – a protocol that allows to collect self reported PSDs associated to brain disorders – at the National Neurological Institute Carlo Besta of Milan.

Results: Mean age of patients was 61 years, 40% females, 61% married, 59% has high school education or higher and 42.5% were retired. Mean duration of the disease was 6.26 years (SD 4.40), mean Hoehn & Yahr Score was 2.00. Most frequent PSDs were related to cognitive and motor slowness (81%), problems with motor functions (stiffness 71%, coordination 71%, tremor 69%, balance 66%, fine movements 65%, standing 60%, lifting and carrying 56%, strength 56%, walking activity 56%), in emotional functions (tiredness 75%, coping functions 70%, emotional impact 66%, depressive symptoms 64%, anxiety 61%), sensory disturbance (63%), sleeping (70%), pain (54%) and finding or understanding words (64%). The main environmental determinants acting as facilitators were: medicines (95%), health professional's attitudes (93%) and care (92%), family assistance (92%) and attitudes (90%), other treatments (87%), friend assistance (74%) and attitudes (72%), assistive devices (71%), peers assistance (50%).

Conclusion: PSDs of patients with PD are varied and differ according to severity and the stage of the disease, as well as the environment in which people live. This study shows that medical intervention alone is not sufficient to reduce burden of patients with PD but it is also important to consider other environmental factors.

Keywords: Parkinson disease, psychosocial difficulties, determinants, environmental factors

[P-043]

Demographic and clinical features and rehabilitation outcomes of our patients with Friedreich Ataxia

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Objective: The aim of the study is to determinate the demographic and clinical features, functional levels and rehabilitation outcomes of our patients with Friedreich's ataxia who were admitted to the inpatient rehabilitation program.

Materials-Methods: A total of 37 patients who were diagnosed with Friedreich's Ataxia according to Harding's diagnostic criteria were included the study. Demographic and clinical features, functional levels before and after rehabilitation were recorded the patients' files retrospectively. The duration of rehabilitation, educational level, age at onset of disease, first affected extremity were recorded. Daily living activities and ambulation levels according to Modified Barthel Index(MBI), Functional Ambulation Classification(FAC), Friedreich Ataxia Rating Scale(FARS) and Hoffer's Ambulation Scale values before and after rehabilitation were recorded.

Results: There were 26 males and 11 females patients in the study. The mean age was 29.2 (SD 9.6) years. The mean duration of rehabilitation was 4.7 (SD 1.4) weeks. There was systemic involvement in 12(32.4%) patients and cardiac involvement in 9(24.3%) patients. All subjects had ataxia. Thirty-three patients (89%) had dysarthria, 18 patients(48.6%) had scoliosis, 16 patients(43.2%) had kyphosis, 15 patients (40.5%) had pes cavus, 5 patients(13%) had optic atrophy, 2 patients(6%) had nystagmus. Barthel Index levels were improved in 33 patients. FARS level were improved in 15 patients. Hoffer Ambulation Scales were improved in 24 patients.

Conclusion: Inpatients with Friedreich's Ataxia, an appropriate and comprehensive rehabilitation program improves daily living activities and ambulation level. Although more efficient in the early stage of disease, rehabilitation program improves functional levels in all cases. Therefore, rehabilitation is essential for the patients with Friedreich's Ataxia.

Keywords: Friedreich Ataxia, rehabilitation, clinical features

[P-045]

Upper extremity neuromuscular and fine motor functions in hospitalized children with cerebral palsy

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Objective: In children with cerebral palsy (CP), upper extremity is frequently affected but arm and hand dysfunction knowledge is limited. The aims of our study were to evaluate upper extremity neuromuscular function, and upper extremity function (unimanuel and bimanuel functions) in these patients.

Materials-Methods: A total of 57 children (37 male, 20 female; mean age 6 years 11 months (SD 3 years 2 months) range 2,5-17 years) who were hospitalized for CP rehabilitation included in this study. A detailed neurologic examination was done for neuromuscular body function (such as muscle strength, muscle tone, range of motion of all upper extremity joints), and for fine motor upper extremity functions were assessed with Bimanual Fine Motor Function Scale (BFMF) and House scale.

Results: This a cross sectional, prospective study to evaluate upper extremity function of cerebral palsied children. According to our neuromuscular function results, there were no contractures or limitation in the range of motion of the upper extremity in our study group. No relationship was determined between muscle strength and BFMF and House scores and these scores does not increased significantly over time. Type of cerebral palsy had a significant influence on BFMF ($r = 0.291$, $p = 0.028$) and House ($r = -0.309$, $p = 0.020$) scores. Bilateral spastic type of cerebral palsy had lower BFMF scores and higher House scores for both right and left scores. BFMF scores did not related with muscle tone, muscle strength and range of motion. It is related with isolated active movements ($r = 0.539$, $p = 0.001$).

Conclusion: Findings of our study showed a strong relationship between unimanual capacity and bimanual performance but does not related with muscle strength and tonus. Throughout childhood, the most important factor about upper extremity improvement is not just to focus on neuromuscular function but also advancement of fine motor skills.

Keywords: Cerebral palsy, upper extremity, spasticity, muscle strength

[P-049]

Characteristics of inpatients in pediatric rehabilitation service

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Objective: This study was taken with the aim of determining the clinical and demographic properties of the Cerebral Palsy (CP) who are treated in our hospital in an inpatient status.

Materials-Methods: In this study; the data of 153 inpatients in the 3rd clinical yard of Istanbul Physical Therapy and Rehabilitation Education and Research Hospital. Patients age, sex, etiologic factors of the musculoskeletal system, deformities, duration of hospitalization and use of orthoses were evaluated.

Results: Data of a total of 153 (92 male and 61 female) patients were studied. Mean age was 5.5 (SD 3.7) years. The most commonly seen disorder was cerebral palsy with a 66.7%. Spina bifida was noted as the second most common disease 8.5%. The other diseases were lined in a decreasing order of percentage as: muscular dystrophies (5.3%), traumatic brain injuries(2.6%), West syndrome (2.6%), metabolic diseases (2.0%), Subacute Sclerosing Panencephalitis-SSPE (2.0%), Guillain Barre syndrome (2.0%), spinal cord lesions (1.3%), Down syndrome (1.3%), brachial plexus lesions (1.3%), transversemyelitis (0.7%), osteochondrosis (0.7%), orthopaedic rehabilitation patients and polineuropathies together (0.7%). The most common etiologic causes were prematurity in the natal period (45.8%), convulsion (36.6%) and trauma (10.0%) in the post natal period. 81% of the patients had a foot deformity and 39.9% of them were using an ankle foot orthosis. 38.6% of the patients were dependent in the degree of a wheel chair. 36.6% of the patients were under treatment for convulsions. Mean hospital stay duration was 36.3 (SD 3.7) days.

Conclusion: The most commonly treated patients in the pediatric rehabilitation service have a diagnosis of CP; one-third of the diseases are other than CP. This study is important in terms of determining patient distribution in the pediatric rehabilitation service, putting an emphasis on and drawing attention to the diseases other than CP.

Keywords: Pediatric, rehabilitation, cerebral palsy

[P-048]

Effect of different types of short-duration training on spatio-temporal parameters of reaching in infants

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Objective: To identify the effect of different types of short-duration training on spatio-temporal parameters of reaching behavior on infants in reclined position.

Materials-Methods: Thirty healthy infants (mean 13.4, SD 1.3 weeks of age) were assigned into three groups: no training-control group (CG), blocked practice training group (BG), and serial practice training group (SG). All groups were trained and assessed pre- and post-training in the reclined position (45°) on the third day of infants' reaching onset. For the assessments, a flexible and attractive object was presented for 2 minutes to stimulate reaching movement. For the training, three different reaching activities were repetitively applied to the infants for 4 minutes: for BG, each trial consisted of repetitions of the same activity (i.e. AAA, BBB, CCC) whereas for SG, alternation of the activities composed each trial (i.e. ABC, ABC, ABC). The assessments were recorded by three digital video cameras and the images were analyzed using the Dvideow 5.0 system and Matlab 7.9. Spatio-temporal measures characterizing reaching behavior were obtained: Movement Duration, Mean Velocity, Straightness Index, Deceleration Time, and Units of Movement. A two-way repeated measures ANOVA was conducted to compare the different groups pre- and post-training.

Results: Movement Duration and Units of Movement presented significant differences ($p < 0.05$) before and after training. More specifically, both movement parameters decreased for BG (mean (SD) from 0.6 (0.2) to 0.4 (0.1) sec and from 4.9 (2.3) to 2.0 (0.6), respectively) and SG (from 0.6 (0.3) to 0.4 (0.4) sec and from 4.3 (2.9) to 2.8 (2.5), respectively). No other significant differences were identified.

Conclusion: Single-session training can impact reaching behavior resulting in more refined and smoother reaches in newly reaching infants. This information adds to the existing knowledge about designing treatment protocols to advance reaching in infants with upper motor dysfunction and emphasizes the role of immediate experience on behavioral performance.

Keywords: Training, physical therapy, motor skills, infant development

[P-050]

Characteristics of cerebral palsy inpatients

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Objective: Our aim was to determine the clinical and demographic characteristics of the inpatients with cerebral palsy (CP) who are treated in our hospital.

Materials-Methods: One-hundred-two patients who stayed in the Istanbul Physical Therapy and Rehabilitation Education and Research Hospital were evaluated. The following data were recorded: age, sex, sub-diagnostic classification of CP, etiologic factors, deformities, orthosis usage, duration of hospital stay, degree of ambulation and operation history due to the disease.

Results: Of the 102 patients included in the study; 67 were male and 37 were female. Mean age was 5.6 (SD 2.2) years. The subtype of CP was spastic in 97 patients (95.1%), dyskinetic in three patients (2.9%) and mixed in two patients (2.0%). The most common etiologic factors were low birth weight, asphyxia and postnatal convulsion. The most commonly seen musculoskeletal deformities were foot deformities. 72.6% of the patients were using an orthosis. According to the Gross Motor Function Measure Classification System (GMFMCS); ambulation level was level 5 in 48% of the subjects and level 4 in 33% of them. Mean duration of hospital stay was 37.6 (SD 3.6) months. The number of patients operated for CP was 10 (9.8%).

Conclusion: Determination of the demographic, etiologic and clinical features of CP patients who are the most commonly encountered patient group in the pediatric rehabilitation services play an important role in the approach to and planning and programming the treatment for these patients.

Keywords: Cerebral palsy, rehabilitation, demographic characteristics

[P-051]

Saturation monitoring among children and adolescents at home. Who, how and why? One-year follow-up

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Objective: To describe the need of saturation (pulse-oxymetry) monitoring at home among children and adolescents. Usually hypoxemia during sleep is a common finding when children use pulse-oxymetry at home. Very often there is long term oxygen therapy at the same time, but there is also other reason for the treatment, for example neurological disorders and apnea. We tried to find out who needs this monitoring, what kind of devices they need and how long they have to use them.

Materials-Methods: Computer-aided devices (Uranus, Miranda, Effector), which are classified as technical aids for disabled persons, were used. The one-year follow-up period was from 2012 to 2013.

Results: The need of saturation monitoring at home is increasingly popular. The hospitals send patients home earlier and most of these patients are premature babies, infants and preschool children. Parents have a much wider responsibility.

Conclusion: Long-term saturation monitoring was used among different chronic diseases in children and adolescents. We need more knowledge and evidence based information about the treatment period.

Keywords: Children and adolescents, saturation monitoring, diagnosis, devices

[P-054]

Existence of depression and anxiety and care burden on the mothers of children with spina bifida

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Objective: The objective of our study was to determine the existence of depression and anxiety and care burden on the mothers of children with spina bifida.

Materials-Methods: Mothers of 29 children with spina bifida and as the control group, mothers of 20 healthy children were included in our study. Following the physical and neurological examinations of the children, they were evaluated according to the Pediatric Evaluation of Disability Inventory (PEDI). Beck Depression and Anxiety Scales and the Care Burden Scale (Burden Interview) were applied to all the mothers

Results: The mean age of the patients included in the study was 3.5 (SD 2.3) years; for the mothers it was 30.5 (SD 6.5). Compared to the control group, the Beck depression, anxiety and care burden scores in the study group were significantly higher, while the PEDI functional scale – self-care (FS-KB) raw and scale scores, the PEDI caregiver assistance (BY) –KB raw and scale scores were significantly lower ($p < 0.05$). PEDI FS-KB raw and scale scores, PEDI BY-KB raw and scale scores decreased significantly with the increasing Beck depression level ($p < 0.01$). PEDI FS –KB raw and scale scores and the PEDI BY-KB raw and scale scores decreased significantly with the increasing Care Burden score ($p < 0.001$).

Conclusion: Our study has shown the existence of depression and anxiety in the mothers of the children with spina bifida and that the mothers are in a state of exhaustion. The possibility of depression and anxiety of the mothers of children with chronic disorders like spina bifida and the burden of care-giving should be kept in mind and the mothers should be supported in this regard.

Keywords: Burden interview, spina bifida, pediatric evaluation of disability inventory

[P-053]

Rehabilitation of a child with critical illness polyneuropathy

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Objective: Critical illness polyneuropathy (CIP) is an intensive care unit acquired neuromuscular disorder characterized by weakness of the limb muscles and diaphragm. The risk factors include sepsis, multiorgan failure, prolonged ventilatory support and systemic corticosteroids. We present a case of critical illness polyneuropathy complicating multiorgan failure and sepsis due to membranoproliferative glomerulonephritis (MPGN).

Materials-Methods: A 12-year-old patient was referred to our hospital due to an ongoing proteinuria.

Results: She was diagnosed as MPGN by renal biopsy and started on pulse steroids and cyclosporine. As the patient developed acute respiratory distress syndrome following plasma exchange procedure, she was put on mechanical ventilation in pediatric intensive care unit. She has been ventilator dependent for 8 weeks and weaning was not possible for 3 weeks. Electroneuromyography revealed bilateral motor polyneuropathy and phrenic nerve involvement. The Medical Research Council (MRC) score of the patient was 38/60. The patient was mobilized with noninvasive mechanical ventilating and after weaning she was started active cycling of breathing techniques. She had active-assisted range of motion exercises, Russian electrical stimulation to the quadriceps and resistive exercises to upper and lower extremities with theraband. After 8 sessions of physiotherapy her MCR score increased to 50/60. She became independent in most of the activities of daily living and was sent home at discharge.

Conclusion: Although CIP might be associated with long term sequel, this patient improved considerably with a relatively short course of physiotherapy. It is of great importance for physiatrists to be familiar with this condition and determine the best rehabilitative approaches.

Keywords: Critical illness, glomerulonephritis, polyneuropathy, rehabilitation

[P-055]

Validity of the turkish version of the ABILHAND-Kids assessment scale – A preliminary study

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Objective: The objective of our study was to evaluate the validity of the ABILHAND-Kids Assessment Scale

Materials-Methods: Thirty-two children with cerebral palsy (CP) were included in the study. After performing the physical and neurological examinations, the children were evaluated using the Gross Motor Function Classification System (GMFCS) and the Manual Ability Classification System (MACS). To evaluate the functioning of the children, the self-care area of the PEDI functional skill scale (FS-KB) and the ABILHAND-Kids scale were used by asking the questions to the mothers. The Turkish version of the ABILHAND-Kids was prepared according to standard translation rules.

Results: The mean age of the CP patients included in the study was 8.0 years (SD 2.3), mean GMFCS score was 2.5 (SD 1.5), mean MACS score was 2.4 (SD 1.5), the mean raw score for PEDI FS-KB was 40.0 (SD 19.6), and the mean ABILHAND-Kids score was 15.3 (SD 12.5). A statistically significant negative correlation was found between the GMFCS and the ABILHAND-Kids scores ($r = -0.611$, $p < 0.001$). A statistically significant negative correlation was found between the MACS and ABILHAND-Kids scores ($r = -0.645$, $p < 0.001$). A statistically significant positive correlation between the PEDI FS-KB and the ABILHAND-Kids scores was found ($r = 0.888$, $p < 0.001$).

Conclusion: ABILHAND-Kids is a scale that evaluates the upper extremity functions of the children in the 5-15 age range. Although we have determined that the Turkish version of the ABILHAND-Kids scale is valid, further assessment of its validity and reliability using more patients is planned.

Keywords: ABILHAND-Kids, cerebral palsy, validity

[P-056]

Effects of rehabilitation in children with idiopathic peripheral facial paralysis: A retrospective study

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Objective: To assess the effects of rehabilitation in children with idiopathic peripheral facial paralysis.

Materials-Methods: Medical records of 103 children who were rehabilitated with the diagnosis of idiopathic peripheral facial paralysis were assessed retrospectively. Each child was assessed by a physiatrist with a standardized procedure and a follow-up within a 6-year period. The severity of facial nerve dysfunction was graded according to the House Brackman Facial Nerve Grading Scale (HB FGS). A standardised rehabilitation programme begun in all patients at the time of the diagnosis.

Results: A total of 103 children with a mean age of 6.2 years were included in the study. We observed 71 children with complete recovery (HB FGS 1) and good recovery (HBFGS 2) after 3 weeks of the exercise programme. 32 children in whom HB FGS \geq 3 was observed after 3 weeks of the exercise programme received electrotherapy. The mean number of electrotherapy sessions was 20.2 (SD 2.0); the sessions contained therapeutic exercises, massage, electric stimulation and infrared rays. The mean HB grade was 1.06 (SD 0.05) at the end of the rehabilitation programme and the improvement from the beginning was statistically significant ($p < 0.001$).

Conclusion: In peripheral facial paralysis with children, exercises programme must start at an early stage. Electrotherapy has a beneficial effect on functional recovery while causing no complications; therefore, it can be used to treat idiopathic facial paralysis in children.

Keywords: Electrotherapy, house brackman facial nerve grading scale, peripheral facial paralysis, rehabilitation

[P-059]

Long-term oxygen therapy at home in children and adolescents: A computer-aided register-based research on medical rehabilitation

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Objective: Long Term Oxygen Therapy (LTOT) at home among children and adolescents in Childrens Hospital, Treatment- period, Equipment of Medical Rehabilitation, Diagnosis of users (indications for oxygen therapy)

Materials-Methods: We used a computer-aided register (respiratory care devices/ equipment). Follow up period years 2004-2011.

Results: Children may require oxygen therapy for a variety of different conditions. The principal aims of LTOT are to prevent harm from chronic hypoxaemia and to improve any relevant symptoms. Oxygen should be regarded as a drug and most of children have also polysomnographia at the beginning and LTOT always started by the order of the doctor. The prognosis in infancy is usually good; many children need oxygen for a limited period, some months or some years. Home oxygen may be provided from cylinders, oxygen concentrators or liquid oxygen systems.

Conclusion: LTOT at home in children and adolescents is very important model of care. Most of the clinical conditions in the infant age group are exclusive and are not seen in adults. Growth and neurodevelopment are important consideration. The follow up is very important and possible with home visits made by rehabilitation counsellor.

Keywords: Long term oxygen therapy, diagnosis, equipment, patient follow-up

[P-057]

Depression in mothers of children with cerebral palsy

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Objective: Mothers of children with cerebral palsy are strongly influenced by the needs of their children. The aim of this study was to assess the depression mood symptoms in mothers of children with cerebral palsy.

Materials-Methods: The 25 mothers of the cerebral palsy patients who had admitted to the Pediatric Rehabilitation Unit were included to the study. Beck Depression Inventory (BDI) were evaluated. The children with cerebral palsy were classified into levels according to the Gross Motor Function Classification System.

Results: There were 25 mothers. The mean age was 21.0 (SD 7.2) years, and the mean BDI of the mothers was 16.3 (SD 8.9). The mean age of the cerebral palsy patients was 36.3 (SD 16.2) month. 52.2% of the family had low monthly income. The children with cerebral palsy were classified more frequently into levels IV (50%) and V (31.2%) of the Gross Motor Function Classification System. There was no statistically significant correlation of the BDI scores of the mothers with the levels of the Gross Motor Function Classification System of the cerebral palsy patients, neither with the monthly income ($p > 0.05$).

Conclusion: The mean BDI scores of the mothers were over 11, but the functional status of the child did not affect the BDI scores. The mothers of the CP patients had mild to moderate mental distress.

Keywords: Cerebral palsy, beck depression inventory, function

[P-060]

Decannulation of patients after long-term mechanical ventilation – Prediction from clinical routine data

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Objective: Variables predicting successful decannulation from a tracheotomy tube after long-term mechanical ventilation remain obscure. To identify such predictors, data of 150 consecutive patients with a tracheotomy due to mechanical ventilation were analyzed in a retrospective design.

Materials-Methods: From the total of 150 patients who were admitted between August 2011 and August 2012 to a neurological rehabilitation center, 103 were successfully decannulated. Items concerning sociodemographic data, indication for mechanical ventilation (neurologic, cardiologic, pulmonic or gastro-intestinal disease), comorbidities, tracheotomy technique (dilational vs. surgical), duration of mechanical ventilation, complications during weaning from tracheotomy tube, nursing-care dependency, alertness, and the degree of aspiration were tested in a multivariable logistic regression model.

Results: A successful decannulation is associated with dilatational tracheotomy, female gender, a low number of comorbidities, a good alertness at the beginning of rehabilitation, and no complications during decannulation procedure.

Conclusion: The identified predictor variables can be collected easily in the clinical routine and can therefore be used for a more targeted decannulation process.

Keywords: Tracheotomy tube, decannulation, predictors, mechanical ventilation

[P-065]

Fibromyalgia in patients with other rheumatic diseases: Prevalence and relationship with disease activity

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Objective: Fibromyalgia (FM) is a syndrome characterized by chronic widespread pain and the presence of specific tender points. The prevalence of FM has been estimated as 2-10% of the general population. Presence of FM in several rheumatic diseases with structural pathology has been reported as 11-30%. The objectives of this study were to determine the prevalence of FM and evaluate the possible relationship of FM existence with disease activities among rheumatic diseases.

Materials-Methods: This study group included 835 patients (197 with rheumatoid arthritis – RA, 67 with systemic lupus erythematosus – SLE, 119 with ankylosing spondylitis – AS, 238 with osteoarthritis – OA, 14 with familial Mediterranean fever – FMF, 53 with Behçet disease – BD, 71 with gout, 25 with Sjögren's syndrome – SS, 20 with vasculitis, 29 with polymyalgia rheumatica – PMR, and 2 with polyomyositis – PM). Age, gender, laboratory parameters, presence of fatigue and disease activity indexes were recorded.

Results: The prevalence of FM in patients with rheumatologic diseases was found to be 6.6% for RA, 13.4% for SLE, 12.6% for AS, 10.1% for OA, 5.7% for BD, 7.1% for FMF, 12.0% for SS, 25.0% for vasculitis, 1.4% for gout, and 6.9% for PMR. Among the 2 patients with PM, one of them was diagnosed with FM. In some rheumatologic diseases (AS, OA) FM was observed mostly in women. There were statistically significant correlations between disease activity indexes and Fibromyalgia Impact Questionnaire (FIQ) scores for most of the patients (RA, AS, OA, BD: $p < 0.05$; $r = 0.60$, $r = 0.95$, $r = 0.89$, $r = 1.00$, respectively).

Conclusion: Concomitant FM is a common clinical problem in rheumatologic diseases. Its recognition is important for optimal management of these diseases. Increased pain and physical limitations and fatigue may be interpreted as increased activity of the disease and such patients can be prescribed higher doses of biologic agent or corticosteroids. Centrally acting analgesics, such as pregabalin, duloxetine and milnacipran can be used to treat the FM. Consideration of the FM component in management of rheumatologic diseases will increase the success of treatment.

Keywords: Rheumatologic diseases, fibromyalgia, disease activity

[P-070]

Urodynamic findings in patients with Spina bifida

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Objective: To identify voiding patterns and the bladder function by performing urodynamic study in patients with spina bifida.

Materials-Methods: Fifty-three patients with spina bifida underwent clinical evaluation, and urodynamic study.

Results: Mean age was 14.6 (SD 6.1) years. Thirty-two patients (60.4%) were girls. Urodynamic study was abnormal in 94% of the patients. Overactive detrusor, overactive detrusor with detrusor sphincter dyssynergia and detrusor areflexia were detected in 49%, 25.5%, and 6% of the patients, respectively. Bladder function was normal in 6%. Mean age of the patients was 10.5 (SD 5.6, range 2.4-25.8) years. Vesicoureteral reflux was determined in 29.2% patients. Urinary excretion type of the patients was clean intermittent catheterization in 42.3%, using diaper in 46.2% and spontaneous voiding in 11.5%. Seventeen patients (32.7%) were using anticholinergic drugs before the urodynamic study. Mean detrusor leak point pressure was 68.3 mmHg (SD 37.1, range 15-169). Mean maximum bladder capacity was 229.8 ml (SD 121.4, range 15-500). A statistically significant difference was detected between maximum bladder capacities of the patients whose use and do not use anticholinergic drugs ($p = 0.019$).

Conclusion: Neurogenic bladder is a condition that necessitates careful follow up in patients with spina bifida.

Keywords: Spina bifida, urodynamic study, vesicoureteral reflux

[P-066]

Degenerative shoulder pain: Epidemiological and descriptive study in a physical medicine and rehabilitation department

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Objective: To investigate the epidemiological profile of patients treated for degenerative painful shoulder in a department of physical medicine and rehabilitation (PMR).

Materials-Methods: A retrospective study of the records of patients treated for painful shoulder between January 2004 and December 2012 was conducted. Epidemiological and clinical parameters were studied.

Results: During the period of study, there were 10917 consultations; 41.5% (4563) of the patients had degenerative musculoskeletal pathologies. Of these, 710 (15.5%) had consulted for shoulder pain (an average of 78.8 cases per year). The average age of patients with shoulder pain was 51.9 years (SD 12.1), with a marked female predominance (men/women ratio 0.46). The most frequent pathologies were tendinopathy of the rotator cuff (48.8%), adhesive capsulitis (25.3%) and conflict between the acromial vault and the cuff (18.8%). Diabetes, female gender, age and manual profession were significantly associated with these nosological entities. The majority of our patients (97.3%) have benefited from rehabilitation therapy with an average of 20 sessions per patient. Analgesics and NSAIDs were prescribed respectively in 78.0% and 66.4% of the cases. Corticosteroids infiltrations were performed in 34% of the cases. The majority of our patients (48.9%) were referred from a rheumatology department, only 12.0% consulted a PMR specialist first.

Conclusion: This study showed a high prevalence of degenerative painful shoulder in a PMR department, the most common diagnosis being tendinopathy of the rotator cuff and adhesive capsulitis, which are particularly frequent in diabetics and aged women.

Keywords: Shoulder pain, epidemiology, rotator cuff, shoulder capsulitis, physical medicine and rehabilitation

[P-071]

Comparison of tree types of ankle-foot orthosis in a patient with foot drop

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Objective: The ankle-foot orthoses are the most commonly prescribed orthoses for lower limbs. They are used for different kinds of injuries. Some patients are not very satisfied with thermoplastic ankle-foot orthosis because they have problems with wearing them with normal shoes. In order to avoid these problems we decided to produce a custom-made orthosis from carbon fibers.

Materials-Methods: We produced three types of orthosis for a patient who had been a user of an ankle-foot orthosis for a long time: a prefabricated orthosis, a custom-made orthosis from thermoplastic and a custom-made orthosis from carbon fibers. The processes of producing each orthosis were compared in detail. For each orthosis, the a questionnaire (Post-stroke Ankle-Foot Orthosis Fitting/Review Tool) was filled in. The finished orthosis were weighted on a computerized scale. We also measured the foot pressures with the F-scan system version 5.0 (Tekscan Inc., USA) with all three orthoses.

Results: The production process was the simplest for the prefabricated orthoses, whereas the most difficult to produce was the orthosis from carbon fibers. The most lightweight was the prefabricated orthosis, followed by the custom-made orthosis from thermoplastic, while the custom-made orthosis from carbon fibers was a little heavier. All three orthoses reached the same goal – they prevented the foot drop. The orthosis from thermoplastic corrected the varus position of the heel better than the prefabricated orthosis. The patient experienced the most comfort with the prefabricated orthosis and the least comfort with the custom-made orthosis from thermoplastic. The custom-made orthosis from carbon fibers yielded the highest pressures under the heel and under the first metatarsal head.

Conclusion: The measured foot pressures indicate that in the studied case the custom-made orthosis from carbon fibers is the most convenient compared with the other two tested orthoses.

Keywords: Ankle-foot orthosis, carbon fibers, patient satisfaction

[P-073]

Easing wheelchair adaptation in spinal cord injury patients: Developing a wheelchair module for a standardised setup

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Objective: Due to the known problems of wheelchair adaptations and changes required during rehabilitation we evaluated the design and performance of a modular wheelchair in a standardised setup.

Materials-Methods: A prototype was developed in 3 sizes (width) with additional basic modifications in 3 removable sizes of chair bottoms and sitting backs. Basic modifications like the tilting of the chair unit, sitting back or chair bottom as well as the height of the chair bottom, the ground clearance or the sitting back, the activity and the weight distribution could be easily done while sitting the patient in the wheelchair. A protocol was setup to sign in all wheelchair parameters, photo-documentation and measurement of pressure distribution for the chair bottom at the beginning and the end of the wheelchair adaptation. The weight balance was measured with a 4-point balance scale to determine the weight distribution 80:20 (back-/front wheels) for the first setup. During the rehabilitation and wheelchair training modification was easily done using the variability of the adjustable modifications in order to improve the wheelchair activity. The proceeding of the wheelchair adaptation was accelerated and the overall time reduced.

Results: Since April 2012, 276 patients have been evaluated. During the rehabilitation in our department, 4 visits per patient were needed in general for the definitive wheel chair setup. From the gathered data, the definitive wheelchair can be ordered, in general without secondary corrections.

Conclusion: The setup we evaluated is now established as a wheelchair module for supplying all clients in our department in need of a wheelchair because of the easy handling, high quality supply and time-saving procedure.

Keywords: Wheelchair adaptation, wheelchair sitting position, wheelchair parameters

[P-075]

Relationship of toe position sense, neurological level and lesion severity with bladder function in patients with spinal cord injury

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Objective: The aim of this study was to evaluate the relationship of toe position sense (TPS), neurological level (cervical, thoracic, lumbar, sacral) and severity of the lesion (complete, incomplete) with bladder behaviour which is investigated with urodynamic study in patients with spinal cord injury (SCI).

Materials-Methods: Fifty nine patients who were on rehabilitation programme in our hospital with the diagnosis of SCI were included in the study. Patient's characteristics and TPS were recorded. Neurological level and severity of the lesion were set according to the American Spinal Injury Association (ASIA) classification. Maximum cystometric capacity (MCC), storage and voiding function and type of detrusor (hyperactive, acontractile) were investigated with urodynamic study.

Results: No significant differences were found between neurological level, lesion severity, TPS and urodynamic findings (storage function, voiding function and type of detrusor) ($p > 0.05$). MCC of cervical injury patients was lower than other levels, herewith MCC of incomplete patients was lower than complete patients, but there was no significant differences between the groups ($p > 0.05$). In addition, MCC of patients without TPS was higher than patients with TPS, however no differences were found between the groups ($p > 0.05$).

Conclusion: Dorsal column - medial lemniscus sensory modalities (proprioception, joint position sense, vibration) are not evaluated in ASIA impairment scale. In this study, there was no significant association between bladder function and TPS. We can say that, neurological level and lesion severity are not an adequate parameter to predict bladder dysfunction, so urodynamic evaluation is necessary for each patient. Further studies are needed to determine the relationship between TPS and bladder function.

Keywords: Bladder, spinal cord injury, toe position sense

[P-074]

Autonomic dysreflexia during urodynamic studies in patients with cervical spinal cord injury

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Objective: Neurogenic lower urinary tract dysfunction is frequent in patients with spinal cord injury (SCI) and it is still a major source of morbidity and mortality. Urodynamic studies are necessary for appropriate bladder management in this patient group. However autonomic dysreflexia (AD) can occur during these investigations. The aim of this study was investigation of occurrence of AD during urodynamic studies in cervical SCI patients.

Materials-Methods: Ninety (82 male, 8 female) patients with cervical SCI who had neurogenic lower urinary tract dysfunction were included in the study. Neurological level and AIS class were determined. Urodynamic examinations were performed by Libra+ (MMS, Enschede, The Netherlands) urodynamic measurement system and by using double lumen 8 F sterile urethral catheters. Sterile serum physiologic at room temperature was filled continuously at a filling rate of 50 ml/min and symptoms and findings of AD (headache, sweating, flushing of the face, an increase in the arterial pressure) were monitored during the studies. The frequencies of AD were compared in high (C1-C5) and low (C6-8) cervical SCI patient groups by Chi-square test.

Results: Fifty-one of patients had high cervical, 39 had low cervical SCI lesions. Mean age in the high and low cervical lesion group was 34.2 (SD 16.1) and 30.4 (SD 12.5) years ($p > 0.05$), and the frequencies of AD were 29/51 (56.9%) and 21/39 (53.8%) ($p > 0.05$), respectively. The overall frequency was 50/90 (55.6%).

Conclusion: Symptoms-findings of AD occur in about half of the cervical SCI patients during urodynamic studies so the investigators should be prepared for this problem. No statistical significant difference was observed in the frequency of occurrence of AD during urodynamic studies in high and low cervical SCI patients.

Keywords: Cervical spinal cord injury, autonomic dysreflexia, urodynamics

[P-076]

Comparison of bladder emptying method frequencies between patients with upper and lower cervical spinal cord injury

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Objective: Neurogenic lower urinary tract dysfunction is a major source of morbidity and mortality in patients with spinal cord injury (SCI). Bladder management and prescription of the appropriate bladder emptying method are necessary in this patient group. There are some differences in functional abilities in upper (C1-C5) and lower (C6-8) cervical SCI patients. Better hand function and better sitting balance are some of these differences and may play role in bladder management. The aim of this study was investigation and comparison of bladder emptying method frequencies between upper and lower cervical SCI patients.

Materials-Methods: Ninety (82 male, 8 female) patients with cervical SCI who had neurogenic lower urinary tract dysfunction were included in the study. Neurological level and AIS class were determined. Neurological assessment and urodynamic examinations were carried out. Urodynamic examinations were performed by Libra+ (MMS, Enschede, The Netherlands) urodynamic measurement system and by using double lumen 8 F sterile urethral catheters. Sterile serum physiologic at room temperature was filled continuously at a filling rate of 50 ml/min. The frequencies of prescribed bladder emptying methods were compared between upper (C1-C5) and lower (C6-C8) cervical SCI patient groups by means of a chi-square test.

Results: Fifty-one of the patients had upper cervical, 39 had lower cervical lesions. Mean age in upper and lower cervical lesion groups were 34.2 (SD 16.1) and 30.4 (SD 12.5) years ($p > 0.05$). The frequencies of the bladder emptying methods were: for spontaneous voiding - reflex voiding - emptying with maneuvers 12/51 (23.5%) and 2/39 (5.1%), for intermittent catheterisation 17/51 (33.3%) and 20/39 (51.3%), and for indwelling catheterization 22/51 (43.1%) and 17/39 (43.3%) for upper and lower cervical lesion group, respectively ($p < 0.05$).

Conclusion: Higher frequency of spontaneous voiding- reflex voiding-emptying with maneuvers in upper cervical lesion group and higher frequency of intermittent catheterisation in lower cervical lesion group observed in our study may be helpful during making clinical decisions.

Keywords: Cervical spinal cord injury, bladder emptying method, urodynamics

[P-077]

Paraplegia due to spinal epidural hematoma developed in a hemodialysis patient: Case report

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Spinal hematoma is a rare but severe neurological condition that may cause death or neurological deficit. It may be idiopathic or develop in patients receiving anticoagulant or antiplatelet medication or who have vascular malformation. Tumor, surgery, trauma, or application of epidural catheterization may also be present in the etiology. A 67-year-old female with chronic renal failure had a sudden onset of pain, abdominal distension and weakness of the lower limbs, which developed during hemodialysis. MRI demonstrated a hematoma at the eighth thoracic and second lumbar vertebrae levels, localized at the posterior side of the canal in the epidural space, which was hyper-intense in both T2A and T1A series and was compressing the spinal cord considerably. She had been treated with drainage of the hematoma and laminectomy at the T8-T10 levels in the clinic to which she admitted after two days. When she admitted to our rehabilitation department 3.5 months after the event, active movement was absent in the lower limbs, except hip flexors with 1/5 muscle strength. In sensory examination, dermatomes to T10 were normal, while T11 level showed hypoesthesia and T12 and below anesthesia. Anal sensation and contraction were absent. Her rehabilitation was interrupted due to severe anemia when she was at 90° in the tilt-table procedure. Patients with chronic kidney disease have musculoskeletal system pain. Spinal epidural hematoma must be remembered in patients receiving hemodialysis. The prognosis is better if the hematoma is diagnosed and spinal canal decompression is performed immediately to prevent permanent neurological deficits.

Keywords: Paraplegia, spinal epidural hematoma, chronic renal insufficiency

[P-079]

The burden on caregivers and affecting factors in patients with spinal cord injury

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Objective: The spinal cord is the most significant component of the locomotor system. Injury of the spinal cord due to various reasons is an important problem with both personal and social aspects, due to the accompanying physical, psychosocial and economic problems. The objective of this study was to explore the factors that could be related with the problems experienced by caregivers in SCI, which may cause long-term disability.

Materials-Methods: 40 patients aged 18 to 65 who were diagnosed with spinal cord injury and 40 healthy individuals who were primarily responsible for caring for these patients were enrolled into the study. Neurological level and completeness of the injury was determined according to the classification of American Spinal Injury Association (ASIA). The functional levels were evaluated with the Functional Independence Scale (FIS), the anxiety and depression levels were evaluated with the Beck anxiety and depression inventory, and caregiving features were evaluated with the Zarit caregiver burden scale.

Results: Among the patients enrolled in our study, the most frequent etiological factors resulting in SCI were traffic accidents and falling from height. A significant correlation was detected between FIS, SCI level and severity, patient scores of anxiety and depression, and the caregiver burden score. While reviewing the relation between the patients' ASIA grades and caregiver burden levels, it was determined that the average care burden level decreased when moving from ASIA grade A to D. In the post hoc (Dunn's multiple comparison) test, the difference between the care burden levels was significant between ASIA A and D ($p = 0.026$), while the difference was not significant between other ASIA grades.

Conclusion: We think that timely determination of the potential risk factors for caregiver burden in SCI, as well as providing an appropriate therapy support, may contribute to higher quality in treatment and care of SCI patients.

Keywords: Spinal cord injury, ASIA scale, care burden

[P-078]

Penile necrosis in spinal cord injury

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A 22 year old paraplegic male patient admitted to our rehabilitation center for inpatient rehabilitation program. He had sustained a spinal cord injury due to a motor vehicle accident when he was 9. His neuromuscular examination revealed 0/5 muscle strength, hyperactive deep tendon reflexes, positive Babinski response and clonus on bilateral lower extremities. Severe spasticity with a modified Ashworth scale score of 3 was observed especially in bilateral gastrosoleus complex and he was anesthetic below T2 dermatomal level bilaterally. Neuromuscular examination of the upper limbs were normal. His ASIA impairment scale was compatible with T2 ASIA A. Urogenital examination revealed an eroded area on the ventral aspect of the distal penile shaft. He has been using an indwelling catheter for 13 years and he admitted that he used it alternately for intermittent catheterization too. This was complicated with sloughing off the distal approximately 4 cm of penile and glandular urethra. After consultation with the urology department, a suprapubic catheter was recommended and reconstruction of the urethra was planned progressively.

The most commonly mentioned urologic problems of SCI patients in the literature are vesicourethral reflux, renal damage, recurrent urinary tract infections, stones and urethral complications. But penile necrosis in a spinal cord injured patient due to an indwelling Foley catheter is very rare. Penile necrosis alone irrelevant to catheterization may accompany Fournier's syndrome, pyoderma gangrenosum and warfarin use. Unlike our case, in the literature all of the patients with penile necrosis associated with Foley catheter use have concomitant diabetes mellitus, probably because of sensorial impairment and microvascular damage. Especially in complete chronic spinal cord injured patients, penile necrosis should be kept in mind. Elimination and if necessary close monitoring of indwelling urinary catheters in patients with SCI is strongly advised.

Keywords: Spinal cord injury, indwelling Foley catheter, penile necrosis

[P-080]

Acute transverse myelitis and guillain-barre overlap syndrome following mumps viraemia

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Mumps infection has some rare complications such as myocarditis, nephritis, pancreatitis, orchitis and hearing problems. The main neurological complications of mumps infection are reported to be meningitis, encephalitis, myelitis, cranial nerve involvement and rarely polyneuropathy.

A 12-year-old male patient was admitted to our clinic with complaints of weakness in the legs, burning pain during urination and fecal incontinence. In his history, patient told to have a mumps infection 1 week ago and his symptoms started to develop 1 day ago and progressing gradually. There was no pathology associated with cranial nerves in neurological examination. He did not have nuchal rigidity. Both lower limbs were flaccid and the proximal and distal upper limb muscle strength was 4+/5. There were anesthesia in lower extremities and hypoesthesia in the distal upper extremity. Deep tendon reflexes of lower extremities were hypoactive and bilateral planter responses were weak. There was no feeling of urination-defecation. when spinal column was assessed by MRI, expansion of cord inferiorly from the level of T6-7 and increased uptake of gadolinium were detected on T-2 weighted sequences. Cerebrospinal fluid (CSF) was clear and under normal pressure (120 mmHg), and increased protein level (150 mg/dL, normal: 15.0-45.0 mg/dL), normal glucose level (70 mg/dL) and 1 leucocyte/mm³ were detected in CSF. IgM and IgG mumps antibodies were positive. In the clinical neuropsychological evaluation results were compatible with sensorimotor polyneuropathy characterized by axonal degeneration and demyelination in bilateral upper and lower extremity. Activation was not observed in the lower extremities in needle electroneuromyography. Patient was performed plasmapheresis due to the diagnosis with GBS based on clinical, laboratory and nerve conduction studies and also intravenous immunoglobulin therapy was started. It should be kept in mind that association of transverse myelitis and Guillain-Barre syndrome can be seen in patients presenting with complaints of weakness in the upper and lower extremities and having atypical clinic.

Keywords: Mumps infection, Guillain-Barre syndrome, transverse myelitis

[P-081]

Does spasticity have a metabolic determinant: Spasticity with hypocalcemia?

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Spasticity is a chronic complication of spinal cord injury. Various stimuli can trigger spasticity, but increased spasticity due to hypocalcemia has not been described yet. We report a 44 year old woman who sustained a spinal cord injury according to a failed back surgery 3 years ago. Her complaint was painful muscle spasms in her legs increased lately which didn't respond to therapy. A questioning for the factors that exacerbate spasticity was non-contributory. Her past medical history comprised a total thyroidectomy 12 years ago.

Musculoskeletal examination showed severe spasticity of the lower extremities with a modified Ashworth scale score of 3. The neurological examination was compatible with ASIA impairment scale L1 ASIA B. The laboratory testing was as follows: serum total calcium (Ca), 5.9 mg/dl (8.2-10.6); ionized calcium (iCa) 3 mg/dl (4.7-5.3); parathormone (PTH), 34 pg/ml (15-68.3); 25 hydroxyvitamin D, 11.3 ng/ml (>30). Oral 3000 mg calcium and 0.5 mcg calcitriol daily and 50 000 IU cholecalciferol weekly was commenced with a likely diagnosis of hypocalcemic muscular spasms due to hypoparathyroidism. Over the next 2 weeks her Ca was elevated up to 8.5 and her complaints resolved with significant decrease in spasticity. Serum Ca concentrations are mainly effected by PTH and vitamin D levels. As a metabolic answer, PTH should be elevated in hypocalcemia. If its level is in low or low-normal limits, this suggests hypocalcemic hypoparathyroidism. The most common cause of hypoparathyroidism is thyroid surgery. It is usually transient but may rarely become permanent. Hypocalcemic symptoms such as muscle cramps, tetany, twitching and paresthesias can be masked in a spinal cord injured patient and complicate the clinical manifestation. In the rehabilitation of spinal cord injured patients especially those with persistent spasticity along with the proper treatment hypocalcemia should always be ruled out.

Keywords: Spinal cord injury, hypocalcemia, spasticity

[P-083]

Immediate effects of whole-body vibration training on gait and static balance in patients with Parkinson's disease

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Objective: Whole body vibration (WBV) exercise has been developed as a new modality in the field of physical therapy. It has been suggested that WBV exercise increases muscular performance and improves body balance in elderly and athlete. This study was conducted to clarify to investigate immediate effects of WBV training on gait disturbance and balance in patients with Parkinson's disease (PD).

Materials-Methods: The subjects were 15 patients with PD (6 males and 9 females; on average 68 years old, SD 13 years) who were able to walk. We measured static standing balance, 10 m gait time, Timed Up and Go test (TUG) before and after carrying out the WBV training at a 25 Hz frequency for 2 min followed by a 2 min interval (Sonic Wave vibration System, Sonic World Ltd, Korea). This course was repeated 3 times. Evaluation of static standing balance was carried out in total length in center of gravity (LNG) and rectangular area (RA) using Force Plate G-1120.

Results: 10 m walking time and TUG were significantly improved (mean 10 m walking time: from 13.6 (SD 7.8) sec to 11.4 (SD 5.0) sec; mean TUG: from 22.7 (SD 33.7) sec to 18.3 (SD 23.7) sec; $p < 0.05$) after WBV training, whereas static standing balance was significantly improved after WBV training (LNG, RA; $p < 0.01$).

Conclusion: Our results indicate that WBV training might have immediate effects on gait disturbance and stand-up and turn in patients with PD. WBV training can be considered to be effective for physical therapy in the rehabilitation field.

Keywords: Whole body vibration, Parkinson's disease, gait, balance

[P-082]

Cost of rehabilitation in spinal cord injury

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Objective: The aim of this study was to determine the common problems in rehabilitation of spinal cord injury (SCI) patients and evaluate their effect on the treatment cost.

Materials-Methods: A total of 247 SCI patients registered in the rehabilitation program as an inpatient between January 2011 and December 2012 were included in the study. Patient data were found retrospectively from medical records. Demographic and clinical data were recorded. Mobility levels were assessed with the Functional Ambulation Scale, lesion level was assessed with AIS scale and spasticity was assessed with Ashworth scale. The presence of any concurrent complications was investigated. Treatment costs were itemized as examination fees, bed fees (with accompanying person), laboratory procedures, medication and medical material and the total inpatient cost.

Results: For the 247 patients (168 males, 79 females) included in our study, the mean age was 38.3 (SD 16) years, mean inpatient duration was 45.1 (SD 22.2) days and mean FAS was 1.6 (SD 1.7). Lesion level as assessed with AIS was: 44.4% A, 16.4% B, 23.3% C, and 15.9% D. The cost (Turkish Lira) was 3241.7 (SD 1979.4) for the examination, 1772.8 (SD 920.5) for bed fees, 136.6 (SD 96.9) for laboratory procedures, 492.8 (SD 750.1) for medication/medical material and 6482.0 (SD 3172.9) for the total inpatient stay. Neurogenic bladder (76.4%) and lower extremity spasticity (46.6%) were the most frequent concurrent problems and 76.1% of patients were treated for spasticity and neurogenic bladder. The inpatient duration showed positive correlation with laboratory procedures, bed fee, medication-medical material and total inpatient stay cost (all $p < 0.05$). The inpatient duration showed positive correlation also with neurogenic bladder and spasticity in subgroup analyses ($p < 0.05$).

Conclusion: Neurogenic bladder and spasticity are most common complications with SCI. Presence of those complications increases prolonging of the rehabilitation program and thus increasing the total inpatient cost.

Keywords: Spinal cord injury, neurogenic bladder, spasticity, treatment cost

[P-087]

Subjective symptoms during a two-year recovery period after stroke

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Objective: Subjective symptoms may affect stroke patients' optimal recovery and long-term psychosocial functioning. This study aims to find out the frequency of and change in of stroke patients' subjective symptoms during the recovery period.

Materials-Methods: 116 working aged patients with their first-ever cerebral infarction were followed for two years. Subjective symptoms reflecting activities of daily living (ADL), cognition, social performance and emotional regulation were examined with a modified version of the Patient's Competency Rating Scale (PCRS). The patients and their caregiving partners filled out the questionnaire at 3, 6, and 24 months after onset. 50 demographic controls were used as a reference group.

Results: At 3 months post stroke up to 20% of the patients reported problems in ADL, cognition or social performance, and up to 47% in emotional regulation. Over 30% of the patients experienced marked self-worries, symptoms of anxiety and depression as well as problems in staying involved in work related activities when bored or tired. Most of the symptoms persisted during the 2 year follow-up. Significant reduction of the frequency of symptomatic patients was detected only in reading comprehension ($p < 0.05$), ability to handle arguments in familiar situations ($p < 0.01$), expression of affection ($p < 0.05$), and self-worries ($p < 0.001$). Patients were aware of their symptoms, however, caregiving partners failed to identify stroke patients' concerns on cognition, social performance or emotional regulation ($p < 0.05$).

Conclusion: Half of our working aged stroke patients reported tiredness and problems in emotional regulation at 3 months after onset, and the frequencies of patients experiencing such symptoms mainly persisted during the two year follow-up. Further, caregiving partners failed to recognize many of the stroke patients' cognitive, social and emotional symptoms. Thus, more attention should be paid to the stroke patient's psychosocial functioning during recovery.

Keywords: Stroke, subjective symptoms, emotional regulation, self-awareness, recovery

[P-088]

Risk factors for falling in elderly patients after stroke

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Objective: Falls among the elderly patients with stroke represent an important public health problem. A high risk of falling after stroke has been reported, both during hospital stay and after patients have been discharged. However, there have been only a few reports that have focused on the factor of elderly patients with stroke. The purpose of this study was to identify risk factors for falling in hemiplegic elderly stroke patients.

Materials-Methods: In total, 21 elderly patients with stroke (15 males, 6 females; mean age 74.6, SD 6.9 years) were included in the study. All falls were reported by medical staff using a dedicated fall report and this formed the basis on which the subjects were allocated into either a faller or non-faller group. The following were extracted from the inpatients' hospital records: occurrence of falls during hospital stay; age; gender; stroke type (infarct/hemorrhage/SAH); time from stroke onset; length of hospital stay; the affected side of the body (left/right/both); Brunnstrom Recovery Stage of lower extremity; Functional Independence Measure (FIM) on admission; Berg Balance Scale (BBS) on admission; 10m gait maximum speed; Mini-Mental State Examination (MMSE); Raven's Progressive Matrices test. The relationships between falls and these patient characteristics were investigated.

Results: FIM, BBS, and RAVEN were significantly lower in the faller group compared with the non-faller group. The Pearson correlation coefficients for the variables show a moderate correlation between FIM and BBS on admission.

Conclusion: The factor for falling in elderly patients with stroke is not only balance ability and physical activity, there is also a relation between spatial cognitive function has been suggested.

Keywords: Falling, elderly stroke patients, functional independence measure, berg balance scale, raven's progressive matrices

[P-090]

Impaired central innervation of intrinsic trunk muscles after stroke

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Objective: Stroke and traumatic brain injury may cause an impaired central control of intrinsic trunk muscles following by deficits in activities of daily living. However, there is no established non-invasive electrophysiological evaluation of this central-nervous dysfunction. We introduced a new neurophysiologic methodology to determine this alteration of the central innervation of trunk muscles to optimize rehabilitation strategies.

Materials-Methods: We investigated 30 patients after stroke. All patients suffered from hemisindrome. We performed a complete measurement of the myoelectrical activity with surface electrodes of paraspinal muscles during dynamic and static tasks 3 weeks and 6 months, respectively, after acute stroke. A group of healthy volunteers served as controls. The acquired EMG parameters are analysed with respect to their spatial and temporal characteristics. This longitudinal study design allowed a correlation between the changes of central-nervous control and both time course and effectiveness of rehabilitation processes.

Results: We found 3 weeks after stroke during dynamic tasks an increase of muscle activity of the non-hemiparetic side, in contrast to static tasks. 6 months after stroke no differences in muscle activity between the paretic and non-paretic side could be determined during static tasks, possibly due to training effects or neurogenic changes. However, a decrease of the muscle activation pattern and gait cycle changes was found during dynamic tasks.

Conclusion: Our results suggest an impairment of the activation pattern of paraspinal muscles after stroke in a time and task dependent manner indicating alterations and adaptive changes (i.e. neural plasticity) of different motor subsystems. This may lead to specific and target-oriented recommendations for the rehabilitation process to further optimize treatment strategies.

Keywords: Stroke, rehabilitation, electromyography, dynamic tasks, static tasks

[P-089]

Immediate effects of whole-body vibration training on gait and static balance in stroke patients with hemiplegia

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Objective: It has been recently reported that whole body vibration (WBV) exercise increases muscular performance and improves body balance in the elderly and in athletes. This study was conducted to clarify to investigate immediate effects of WBV training on gait disturbance and balance in stroke patients with hemiplegics.

Materials-Methods: The subjects were 18 ambulatory stroke patients with hemiplegics (12 males and 6 females; on average 63 years old, SD 14 years) in our hospital. We estimated the range of joint motion in lower limb by straight leg raising (SLR) test and measured static standing balance, 10m walking time, Timed Up and Go test (TUG) before and after carrying out the WBV training with 25Hz frequency for 2 minutes (Sonic Wave vibration System, SONIC WORLD Ltd, Korea) three times on standing position. Evaluation of static standing balance was carried out in total locus length (Force Plate G-1120, Anima, Japan),

Results: The range of joint motion of lower limb by SLR test in paralytic side was significantly increased ($p < 0.01$). Mean 10 m walking time and TUG were significantly improved (10 m walking time: from 19.0 (SD 9.8) sec to 17.3 (SD 7.7) sec, $p < 0.05$; TUG: from 21.2 (SD 11.5) sec to 19.7 (SD 8.8) sec, $p < 0.05$) after WBV training, whereas static standing balance was not significantly improved.

Conclusion: These results indicated that WBV training might have immediately effects on gait disturbance and the range of motion in lower limb in stroke patients with hemiplegics. WBV training was considered to be effective for physical therapy in rehabilitation field.

Keywords: Whole body vibration, training, stroke

[P-091]

A preliminary study to evaluate the relationship between functional status of stroke patients and depression level and quality of life of their caregivers

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Objective: Depression is a frequent problem in stroke patients. But depression also often affects caregivers of stroke patients. The aim of this study was to describe the relation between the patients' functional status and the caregivers' depression level and quality of life.

Materials-Methods: 62 subacute and chronic stroke patients (42 male, 20 female) with a mean age of 64.1 years (SD 11.3) on average 13 months after stroke, and 61 caregivers (11 male, 50 female) with a mean age of 51.2 years (SD 15.4) were included in this study. The patients were evaluated by the use of Brunnstrom for motor recovery, Modified Ashworth Scale for spasticity, Mini-Mental Test (MMT) for cognitive status, Rivermead Mobility Index (RMI) for mobility, and Barthel Index for functional status. The caregivers were evaluated for mood disorders using Beck Depression Scale (BDS); quality of life was evaluated using the Nottingham Health Profile (NHP).

Results: We found depressive mood findings in 32 (52.5%) caregivers. There was no significant difference between women and men in BDS scores ($p > 0.05$). In women the NHP scores (pain, sleep and emotional reactions) were higher than in men ($p = 0.022$, 0.039 and 0.047, respectively). We found a significant correlation between the caregiver age and NHP pain and mobility ($p = 0.002$ and 0.004, respectively); no significant correlation was found between the caregiver age and BDS scores ($p > 0.05$). No significant correlation was found between Brunnstrom, RMI, MMT and caregivers BDS scores ($p > 0.05$); however, a significant correlation was found between Barthel Index and caregivers BDS scores ($p = 0.049$) and NHP energy ($p = 0.041$). A significant correlation was found between all parameters of the NHP and BDS scores ($p < 0.001$).

Conclusion: We found that depressive mood changes in caregivers are correlated with the functional status of the patients whom they care for. For this reason, depression should be evaluated both in patients and their caregivers.

Keywords: Caregivers, depression, hemiplegia

[P-092]

Effectiveness of the second-stage rehabilitation in stroke patients with cognitive impairment

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Objective: evaluate recovery of functional status and effectiveness of the second stage rehabilitation depending on degree of cognitive impairment in stroke patients.

Materials-Methods: The study involved 226 stroke patients. Functional status was evaluated using the Functional Independence Measure, cognitive function using the Mini-Mental Status Examination scale, and severity of neurologic condition using the NIHSS scale. Patients were divided into 4 study groups based on cognitive impairment: severe, moderate, mild or absent.

Results: Cognitive impairment is prevalent in slightly more than half of all cases (53%), while the degree of cognitive impairment is distributed approximately equally: mild impairment (18%), moderate impairment (17%), and severe impairment (18%). Improvement of functional status was observed in all study groups ($p < 0.001$). In patients with moderate and severe cognitive impairment the cognitive recovery was significantly more expressed than in other study groups ($p < 0.001$). Insufficient recovery of functional status was significantly associated with hemiplegia (OR=11.15; $p = 0.015$), urinary incontinence (OR=14.91; $p < 0.001$), joint diseases (OR=5.52; $p = 0.022$), heart diseases (OR=4.10; $p = 0.041$), and severe cognitive impairment (OR=15.18; $p < 0.001$), while the moderate and mild cognitive impairment are not associated with the recovery of functional status.

Conclusion: During the second stage rehabilitation of stroke patients, the functional status as well as cognitive and motor skills are improving both in patients with and without cognitive impairment, though throughout the whole second stage of rehabilitation the functional status in patients with severe or moderate cognitive impairment is inferior to that of patients with mild or no cognitive impairment. In complex rehabilitation of stroke patients, it is relevant to evaluate the cognitive impairment since they influence the effectiveness of rehabilitation.

Keywords: Stroke, rehabilitation, functional status, cognitive impairment

[P-094]

Gender differences in rehabilitation of stroke patients

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Objective: This study; age, etiologic factors, motor status, complications in stroke patients was planned in order to initiate assess gender differences.

Materials-Methods: 209 stroke patients admitted for rehabilitation were evaluated retrospectively. The demographic characteristics, etiology, duration of hospitalization, existing diseases, accompanying pathologies and complications were recorded. Motor status was performed according to Brunnstrom motor staging. Muscle tone was assessed with Modified Ashworth Scale.

Results: 142 patients were women and 66 were men. The average age of the patients was 61.9 years (SD 12.6) for women and 60.4 years (SD 11.4) for men. Among the women, left-hand side was affected in 38.0% and right-hand side in 61.3%. Among the men, left-hand side was affected in 60.6% and right-hand side in 37.9%. Among the women, the most common accompanying pathology was dysarthria (33.8%), followed by urinary incontinence (19.7%). Among the men, 33.3% had dysarthria but 62.1% had urinary incontinence. The most common complication among women was shoulder pain (52.1%), followed by depression (21.1%). Among the men, 89.3% had shoulder pain and 40.0% had depression. Regarding motor assessment, there was no difference between men and women ($p > 0.05$). Mean hospital length of stay was 34.1 (SD 32.9) days for women and 35.2 (SD 14.7) days for men.

Conclusion: Knowing the gender differences regarding the complications, clinical, and motor status in stroke patients is beneficial for planning their treatment.

Keywords: Stroke, gender, motor status, complications

[P-093]

Effect of occupational therapy on motor and functional outcome in stroke rehabilitation

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Objective: To investigate whether combine application of standard stroke rehabilitation program with occupational therapy in the content of repetitive task specific training, provided additional benefits to motor and functional outcome of upper extremity in patients with stroke.

Materials-Methods: The study was designed as prospective, randomized, controlled, single blind clinical trial. Fifty two (52) patients who developed hemiplegia due to cerebrovascular accident were included in the study. Inclusion criteria were: having first stroke, cooperated to the therapy protocol and having <12 months post stroke period. Patients were randomized into two groups; standard stroke rehabilitation program and occupational therapy in the content of repetitive task specific training were performed for group 1 (n=26) and only standard stroke rehabilitation program was performed for group 2 (n=26). One patient in group 1 did not attend the therapy program. All patients were evaluated before and after the treatment. Efficiency of the treatment was evaluated by Visual Analog Scale (VAS), Brunnstrom grades, Modified Ashworth Scale, Nine Hole Peg Test (NHPT), Barthel Index (BI), Fugl Meyer Motor Assessment upper extremity component and Nottingham Health Profile (NHP).

Results: Group 1 and 2 were compared in terms of age, gender, marital status and hemiplegic side and were not recorded any significant difference. Brunnstrom grading (in upper extremity) and NHP emotional reactions score was significantly improved in group 1. NHPT, BI, VAS, MAS were not differs between two groups.

Conclusion: Despite our results did not support combined therapy clearly, according to literature and treatment guidelines occupational therapy including repetitive task specific training is suggested in upper extremity stroke rehabilitation as a complementary procedure. There are still questions that have to be answered, so further studies are required on this issue.

Keywords: Stroke, upper limb, occupational therapy, repetitive task specific training

[P-095]

The reliability of the cumulative illness rating scale and multimorbidity in vascular stroke

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Objective: To measure the multimorbidity with a particular scale provides valuable information for the management in stroke. The aim of this study was to investigate the multimorbidity and the reliability of the Cumulative Illness Rating Scale (CIRS) in a group of vascular stroke patients in the rehabilitation setting.

Materials-Methods: Fifty-two patients with vascular stroke in a rehabilitation hospital were included in this study. All the patients were examined and medical records were completed by the same physician. After the first evaluation three physicians scored the CIRS from the medical records. This process was repeated one month later by the same three physicians. Modified Barthel Index was used for the assessment of the functional status.

Results: Mean age was 65.6 (SD 9.9) years and mean CIRS score was 16.0 (SD 4.4). Twenty-seven (52%) of the patients were women. The most common chronic conditions associated with stroke were vascular problems (94.2%), endocrinologic and metabolic disorders (76.9%) and psychiatric problems (69.2%). The intraclass correlation coefficients were between 0.97 and 0.99 for the intra-rater reliability and 0.96 for the inter-rater reliability of the CIRS.

Conclusion: All the stroke patients had multimorbidity and both the intrater and interrater reliability of the CIRS was found to be very good. The most frequent chronic conditions associated to stroke were vascular problems, endocrinologic and metabolic disorders, and psychiatric problems.

Keywords: Cumulative illness rating scale, stroke, multimorbidity, modified barthel index, reliability

[P-096]

Age differences in rehabilitation of stroke patients

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Objective: This study was planned to assess the relation between duration of hospital stay, complications and age in stroke patients.

Materials-Methods: 209 stroke patients admitted for rehabilitation were evaluated retrospectively. The demographic characteristics, etiology, duration of hospitalization, existing diseases, accompanying pathologies and complications were recorded. Motor status was assessed according to the Brunnstrom motor staging. Muscle tone was assessed with the Modified Ashworth Scale. Patients in group 1 were under the age of 65. Patients in group 2 were 65 years of age or older.

Results: The patients younger than 65 years were 55.2%. The average age of the patients was 52.7 (SD 8.9) years in group 1 and 71.7 (SD 5.26) years in group 2. In Group 1, 66.1% of the patients had ischemic stroke and 33.9% had hemorrhagic stroke; in group 2, 86.0% had ischemic stroke and 13.9% had hemorrhagic stroke. In group 1, dysarthria was present in 44.3%, urinary incontinence in 22.6% and accompanying pathologies in 37.6% of the patients (they were present in 25.8% of the patients in group 2). The two most frequent complications in group 1 were shoulder pain (57.4%) and depression in 27.0%; in group 2, 68.8% and 29.0% suffered from these complications, respectively. The mean duration of hospitalization in group 1 was 34.1 (SD 15.8) days and in group 2 it was 35.3 (SD 34.9) days.

Conclusion: When evaluating stroke patients, age is a parameter that should be taken into account.

Keywords: Stroke, age, motor status, complication

[P-098]

Effects of the isokinetic strengthening training on functional parameters, gait and life quality in patients after stroke: A randomized controlled trial

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Objective: To evaluate the effects of the isokinetic strengthening training applied to bilateral knee-ankle muscles on balance, functional parameters, gait and life quality in stroke patients.

Materials-Methods: 50 inpatient cases (33 male, 17 female) with subacute-chronic hemiplegia after stroke and 30 healthy cases (age-gender were similar) were included and stroke patients were randomized into isokinetic and control groups. Conventional rehabilitation program was applied to all cases; additionally maximal concentric isokinetic strengthening training was applied to the knee-ankle muscles to the isokinetic group five days a week for three weeks. Biodex System 3 Pro Multijoint System isokinetic dynamometer was used. The groups were assessed by Functional Independence Measure, Stroke Specific Quality of Life Scale, timed 10-meter walk test, six-minute walk test, Stair-climbing test, timed up & go test, Berg Balance Scale, Rivermead Mobility Index.

Results: The isokinetic peak torque (PT) values of the knee and ankle were significantly lower in the hemiplegic cases than the healthy cases on both paretic and nonparetic sides ($p < 0.05$). After the rehabilitation program; life quality, gait, balance and mobility index values were found significantly high in both groups, besides the increase levels were found significantly higher in the isokinetic group than the control group ($p < 0.025$, $p < 0.05$). Furthermore, the isokinetic PT values of the knee and ankle on both sides significantly increased in all cases. PT change values were significantly higher in the isokinetic group than the control group except for the values of the knee extension at 180°/sec angular velocity (AV), ankle extension at 60°/sec AV on paretic side; ankle extension at 60°/sec AV and flexion at 120°/sec AV on nonparetic side ($p < 0.025$).

Conclusion: Our results show that bilateral isokinetic strengthening training in addition to conventional rehabilitation program after stroke is effective on strengthening muscles on both sides, improving functional parameters, gait, balance and quality of life.

Keywords: Hemiplegia, isokinetic exercise, quality of life, rehabilitation, stroke

[P-097]

Risk factors for post-stroke depression among stroke patients

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Objective: The study aimed to establish prevalence and risk factors for post stroke depression.

Materials-Methods: 209 stroke patients admitted for rehabilitation were evaluated retrospectively. The demographic characteristics, etiology, duration of hospitalization, existing diseases, accompanying pathologies and complications were recorded. Motor status was assessed according to the Brunnstrom motor staging. Muscle tone was assessed with the Modified Ashworth Scale. Diagnosis of depression after stroke was made by the psychiatrist, and treatment and follow-up were planned accordingly.

Results: There were 53.4% women among the 59 patients with depression. The mean age was 61.5 (SD 12.3) years. The mean length of hospital stay was 38.1 (SD 14.4) days. Among the patients with depression 69.0% had left hemiplegia. There were 150 patients without depression (72.2%); among them, 81 (54%) were women. The mean of the patients without depression was 61.0 (SD 12.0) years; 50% had left hemiplegia. There was no statistically significant difference between the patients with and without depression in terms of gender, education, and marital status ($p > 0.05$). Between the two groups, there was also no statistically significant difference in terms of disease duration, etiology and lesion type ($p > 0.05$). There was a significant association between depression and both Brunnstrom motor staging ($r = -0.38$, $p < 0.01$) and Modified Ashworth Scale score ($r = -0.37$, $p < 0.01$).

Conclusion: Depression after stroke is often observed and it should be taken into consideration when planning the treatment.

Keywords: Stroke, depression, age

[P-100]

Global home care and telerehabilitation system for stroke patients with motor disability

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In Catalonia, every year more than 5000 patients suffer brain damage resulting in long term disability. Physical rehabilitation during the following months after the event have shown to reduce disability. However there is a limitation in the access to in-hospital or ambulatory rehabilitation therapies. We aimed to study the impact of a global telemedicine and rehabilitation system (GTRS) including home telerehabilitation.

Based on a movement detection camera (Kinect©) and a videoconference medical follow up system, in terms of functional recovery, medical control, patient satisfaction and costs. A pilot study will include mild/moderate disabled patients with brain damage discharged from our hospital. An easy to install system, including a camera, a console and a set of exercise equipment according to the needs of each patient will be provided. The system will guide the patient through the rehabilitation program offering continuous performance feed-back. Remote advice and supervision will be performed by a physiotherapist. Several teleconsultations will be periodically made at patient's home for medication regulation and risk factor control. Technological adjustments will be done to ensure correct system operation and data transfer to the central control center.

In the second phase eligible patients will be randomized to standard medical control and ambulatory rehabilitation with daily transport to the rehabilitation center Vs GTRS. After 3 months of treatment a final evaluation will be performed in the clinic, including: disability scales, clinical control and a self-satisfaction questionnaire. A short- and long -term cost-effectiveness study will compare both treatment strategies. The study is currently actively under development.

Keywords: Telerehabilitation, global care home, stroke

[P-101]

Determination of dysphagia levels and risk factors of the subacute and chronic hemiplegic patients and their effects on rehabilitation results

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Objective: To determination of the relationships between post-stroke dysphagia and the parameters such as demographic features, comorbid diseases, ambulation levels, daily living activities and quality of life before and after the rehabilitation program.

Materials-Methods: 70 Patients with hemiplegia after cerebrovascular accident(CVA) who had been admitted in the rehabilitation program, were included in the study. Patients having two or more determinants of Daniel's Clinical Aspiration Scale were rated as dysphagic. While the study group consisted of 35 dysphagic hemiplegic patients, the control group consisted of 35 hemiplegic patients without dysphagia. Dysphagic patients were divided into two groups as mild and severe dysphagia according to their swallowing scores. Age, gender, period of time after CVA, side, etiology and a previous history of CVA, comorbid diseases, hospitalization period, and Charlson indexes(CI) of the patients were recorded. Appropriate rehabilitation was performed according to the patients' hemiplegia. Daily living activities of the patient were assessed by Modified Barthell Index(MBI), ambulation levels were assessed by Functional Ambulation Scale(FAS) and Quality of life were assessed by Short Form(SF-36) before and after the program.

Results: There was no significant difference between the dysphagic group and the control group in terms of age, gender, period of time after CVA, hemiplegic side, etiology, previous CVA history, CI, neurophysiologic evaluation, MBI and FAS before and after the hospitalization. The hospitalization of the dysphagic group was longer in comparison to the control group($p < 0.05$). The most frequent comorbidity was hypertension. SF-36 vitality and mental health values were significantly lower in the dysphagic group($p < 0.001$). Hospitalization periods of the patients in the severe dysphagic group were longer. SF-36 vitality was lower in severe dysphagic group. A positive correlation was detected between the hospitalization period, swallowing score and CI.

Conclusion: Poststroke dysphagia doesn't affect daily living activities and ambulation level but increases the hospitalization period and decreases the quality of life.

Keywords: Hemiplegia, rehabilitation, post-stroke dysphagia

[P-103]

The preference for orthoses in young and old stroke patients and its effect on rehabilitation results

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Objective: Our aim was to study the role of age in the orthotic preferences of stroke patients and the effects of age on the functional results on stroke patients.

Materials-Methods: 150 young and 150 old stroke patients were included in this study. Motor function was assessed using the Brunstrom (BR) scale; level of independence in activities of daily living was assessed using the Functional Independence Measure (FIM); and ambulatory status was assessed using the Functional Ambulation Scale (FAS) at admission and after discharge from the rehabilitation program.

Results: The average age of young patients was 43.9 (SD 9.4) and the average age of old patients was 72.8 (SD 6.09) years. BR median score for young patients for the upper extremity was 3 at admission and 4 at discharge; for the hand it was 2.5 at admission and 3.5 at discharge; for the lower extremity it was 3 at admission and 4 at discharge. For the old patients for the upper extremity it was 2 at admission and 3.5 at discharge; for the hand it was 2 at admission and 4 at discharge; for the lower extremity it was 3 at admission and 4 discharge. There was no significant difference between the two groups in terms of admission FIM scores. FIM gain score was significantly higher in young patients. FAS median with for the young patients was 3 at admission and 4 at discharge; for the old patients it was 1 at admission and 2 at discharge. When patients were evaluated in terms of the use of orthotics and support, orthotic utilization rate in old patients (64.0%) was found to be significantly higher than in young patients (47.3%; $p = 0.004$). Regarding the type of orthosis young patients preferred short walking orthoses whereas old patients preferred solid AFO, articulated AFO and the leaf spring. Usage rate in old patients (93.3%) was significantly higher than in the young patients (68.0%; $p < 0.001$). Regarding support, the young patients preferred the single-point stick whereas the old patients preferred a tripod and the walker.

Conclusion: The functional gains among young stroke patients were higher than among old stroke patients. The usage of orthoses and vehicles among older patients was higher than among young stroke patients.

Keywords: Orthotic preferences, age, rehabilitation outcomes

[P-102]

A rare cause of post stroke dizziness – Vestibular schwannoma: A case report

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Dizziness can be seen in 20% of long term of cerebrovascular disorders. Dizziness can cause imbalance and falls. For that purpose new or already occurred dizziness symptom should be searched the etiology carefully in post stroke patients. In our case, 67 years old left hemiplegic lady, two months after stroke, was admitted to our rehabilitation clinic for neurologic rehabilitation. Second day after admission to our hospital she had a complain about vertigo. Vertigo characteristics were suddenly, during walking not sitting, not having symptoms such as nausea, vomiting, imbalance. She had no sensation that objects in the environment are moving; felt as if she was moving around. In neurological examination, no change was obtained. Berg Balance Score was 41/50. Cerebellar tests were normal. Due to thought of the etiology of dizziness might be peripheral causes, patient was consulted to an Ear Nose Throat specialist. Due to recommendation of consultant, necessary tests and Temporal(ear) MRI were made. MRI was reported as there were signal changes, related to vestibular schwannoma. In chronicle stage of post stroke patients, chronic dizziness can be seen frequently. Some symptoms can not be seen and some are seen more precisely in stroke patients. Incidence of vestibular schwannoma is 1/100.000/year. Mean age of diagnosis of vestibular schwannoma is 50. Patients with schwannoma have tinnitus (63%) and hearing loss (95%). However only 2/3 of those patient have the awareness of this hearing loss limitation. Unsteadiness is 61% of patient with schwannoma which is not a true spinning vertigo. Since same symptoms may be seen in both stroke patients and patients with vestibular schwannoma, a complete physical examination with necessary tests should be done. Patients with dizziness after stroke, should not only think the cause of the dizziness is stroke but also etiology of the dizziness must be exhaustively researched.

Keywords: Stroke, dizziness, vestibular schwannoma

[P-104]

Functional outcome and social reintegration of patients with traumatic brain injury in the Tunisian population

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Objective: The main objective of this work is to investigate the epidemiological and socio-professional outcome of a population of TBI followed by physical rehabilitation department in Fattouma Bourguiba's hospital.

Materials-Methods: We analyzed the medical records of TBI admitted to Rehabilitation department, during the period between January 2009 and December 2012. The following parameters were analyzed: mechanism of trauma, the season of onset, initial GCS, length of coma and demographic characteristics, the nature of neuro-orthopedic sequelae, cognitive disorders, and functional level assessed by the FIM (Functional Independence Measure). All patients (or their families if severe cognitive problems) were contacted by telephone to assess their socio-professional status by administering a pre-established questionnaire.

Results: The average age of the 42 patients included in the study was 27.3 (SD 17.0) years, mostly male (81%). Twenty three percent of the accidents took place during the summer and two accident circumstances predominate: Road Accidents (RA) (69%) and Domestic Accidents (DA) (19%). Time management in functional rehabilitation averaged 15 months. The average of initial Glasgow Coma Score was 7.3 (SD 4.5). All patients included in this study were socially active before the accident. Only 7.1% of them had returned to work and only 9.5% had resumed their schooling. Problems with memory, executive functions and thinking were reported in 61.9%. The behavioral troubles (frontal syndrome and emotional problem health) were noted in 23.8% of cases. The average value of the FIM was 84.5.

Conclusion: Our study population is relatively young and predominantly male. The rehabilitation management is very late and the rate of socio-professional reintegration is very low. These findings highlight the importance of providing coordinated medical rehabilitation and intensive care unit to promote social outcomes after TBI.

Keywords: functional outcome, social reintegration, traumatic brain injury

[P-106]

Avoiding complications of long term immobilization: Positioning patients in intensive care units

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Complications have risen with the long term treatment in intensive care units. Particularly, spasticity development causes restriction in range of motion and it makes patient positioning harder. In this report, a case of ulnar neuropathy due to the spasticity causing long period flexion in the elbow joint has been presented.

A 14-year-old male admitted to our clinic for rehabilitation program with a previous diagnosis of anoxic brain injury. In his medical history; he suffered cardiopulmonary arrest while he was running four months ago. He was resuscitated afterwards he was followed in intensive care unit and pediatric neurology for three months. On physical examination; general condition of the patient was good. He was conscious with mildly limited cooperation and he had a dysphasic. The range of motion for the left elbow was between 30 and 135 degrees, and left elbow was in a position of flexion. Moreover, there was spasticity (Ashworth 3) in left elbow flexor muscles. Left hypotenar and interosseous muscles were atrophic. He had also hyperextension of 4th and 5th metacarpophalangeal joints and flexion of 4th and 5th proximal and distal interphalangeal joints. The muscle strength of left wrist flexors and 5th digit abduction were 4/5 and 0/5 respectively. Our patient was able to ambulate with physical assistance of one person. Electromyographic evaluation indicated left ulnar neuropathy at left medial epicondyle. Radiograph and magnetic resonance imaging of left elbow did not show any pathology compressing the ulnar nerve. Whereas ultrasonography showed left ulnar nerve as edematous, larger and increment cross-sectional area (right 5.84 mm², left 3.25mm²) when compared to the right side. Spasticity which is concomitant with prolonged immobilization increases frequency of preventable complications in patients without considering positioning. We would like to highlight and recognize the early rehabilitation program in intensive care units.

Keywords: Immobilization, spasticity, positioning, ulnar neuropathy

[P-108]

Older people and development of new possibilities to prevent their falls

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Objective: The need for fall prevention and detection has been realised and a lot of research has been done on the area. Still there is a need for effective solution for fall prevention among older people. The need is obvious because of the high cost for society and people themselves with increased use of rehabilitation and care. A preventive and motivating solution should reduce costs regardless of the purchasing body. Ageing in Balance (AIB) -project is carried out in cooperation with Finnish, Swedish and Spanish organisations and is a part of AAL Joint Programme (Ambient Assisted Living). The main objective of the project is to develop a model for fall risk assessment and ICT tools for fall prevention in close co-operation with older people. During the project fall risk model is developed and evaluated with end users.

Materials-Methods: Planned scenarios have been evaluated by older people and professional users. Based on the scenario evaluation, older people are interested in participating in the development process. The project aims to recruit 60 participants in Finland and 10 in Spain, including two intervention groups and one control group. Measurements and follow up is done with all groups. Baseline measurements include assessment scales, intelligent gym devices, wearable movement sensor, interviews and observations.

Results: The proposed system is planned for both primary and secondary fall prevention. The intervention methodologies are rehabilitative, with the aim of preventing the majority of falls and preserving and increasing the functional capabilities and quality of life of older people. Test persons receive information on their group's risk for falls beside their own risk results.

Conclusion: This viewpoint could be helpful also for organisations producing services in shelter homes in planning their activities.

Keywords: Fall prevention, quality of life, end users, risk assessment

[P-107]

DACHOR – An active orthotic solution for drop foot treatment

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Objective: The conventional approach to treat drop-foot gait relies on passive mechanical braces known as Ankle Foot Orthoses (AFO). Although these AFOs have been shown to improve gait, they only provide passive support during locomotion. Within this scope, the DACHOR (Dynamics And Control of Hybrid active ORthoses) project proposes the development of an active AFO comprising a mechanical actuator, to provide support throughout all gait phases, combined with a Functional Electrical Stimulation (FES) actuator, that will harness as much energy as possible from the patient muscles, until fatigues start to surface.

Materials-Methods Development of a hybrid orthosis with characteristics of a mechanically-actuated active AFO combined with functional electric stimulation.

Results: The DACHOR project developed an innovative Hybrid Active AFO (HAAFO) to treat drop foot. Currently, the mechanical actuator and the FES systems have been built, together with a sensor network of inertial and pressure sensors that enable correct detection of the gait phases. To be able to better help the daily locomotion of drop foot patients, the HAAFO will use a hybrid controller architecture, that minimizes energy consumption and maximizes foot function by balancing the FES and mechanical actuators usage during gait. The uniqueness of this HAAFO system is based on the active role that the mechanical part plays when the muscle is fatigued and FES is no longer efficient.

Conclusion: This project will allow a passively and actively assisted motion of the ankle during gait with the benefits of FES rehabilitation.

Keywords: Ankle foot orthosis, functional electric stimulation, drop foot, gait

[P-110]

Relationship of The Berg balance scale and dynamic walking stability in post-stroke hemiplegic patients

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Objective: The Berg Balance Scale (BBS) was developed as a performance-oriented evaluation tool of balance in elderly individuals and is useful as a screening test to evaluate fall risk. BBS is also a useful assessment method for evaluating walking ability. However, it is unclear whether BBS accurately reflects dynamic stability during walking. Therefore, we sought to reveal the relationship between BBS and dynamic stability indexes. This study aimed to investigate whether BBS reflects walking stability.

Materials-Methods: This study was of a cross-sectional design. Forty-three post-stroke hemiplegic patients participated in this study (age: mean 63.7, SD 10.3 years; stroke type: hemorrhage in 27 and infarction in 16; paralysis side: right in 20 and left in 23; duration from onset: mean 107.6, SD 39.5 days; Functional Ambulation Category [3/4/5]: 22/12/9 patients). A tri-accelerometer was fixed over the L3 spinous process by using an elastic bandage. The subjects were instructed to walk along a 10-m walkway at a comfortable speed, and BBS (14 items) was assessed by physical therapists. Root mean square (RMS), autocorrelation coefficient of symmetry (ACC-S), and autocorrelation coefficient of regularity (ACC-R) were calculated based on the acceleration data obtained in 3 gait cycles. We evaluated the correlation between BBS and each walking stability index using Spearman's ρ . Values of $p < 0.05$ were considered statistically significant.

Results: BBS was significantly correlated with RMS ($\rho = -0.70$, $p < 0.01$) and ACC-S ($\rho = 0.48$, $p < 0.01$). However, there was no significant correlation between BBS and ACC-R ($\rho = 0.25$, $p = 0.123$).

Conclusion: BBS showed a high correlation with RMS and a moderate correlation with ACC-S. These findings suggest that BBS is related to the control ability of perturbation during walking in post-stroke hemiplegic patients.

Keywords: Stroke, berg balance scale, dynamic stability, gait

[P-111]

Use of force platform and visual feedback in the therapy of stability disorders

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Objective: Because of permanently increasing incidence of brain damage, the rehabilitation of these patients is becoming increasingly important. A considerable element in any rehabilitation program is carefully directed, well-focused repetitive practice. Methods based on biological feedback are appropriately supplementing conventional rehabilitation procedures. The system for diagnostics and therapy of stability disorders using visual feedback and repetitive practice is being developed at the Joint Department of Biomedical Engineering of the Czech Technical University and the Charles University in Prague. Software was created by an interdisciplinary team containing biomedical engineers, rehabilitation doctors and therapists. The hardware set consists of Standard PC, stereoscopic projection and force platform – WiiBalance Board. The force platform device used in this rehabilitation system was compared with an official medical device, the Synapsys posturography system, to validate suitability of the platform for objective evaluation of postural reactions.

Materials-Methods: We have examined the postural responses of 20 healthy adults (10 men, 10 women, average age 27 years) using always the same procedure. Half of them was examined first on the clinical platform and then on the experimental, the other half in reverse order. Each experiment consisted of 4 parts, each part took 60 seconds: Stance on a firm surface with open and closed eyes, stance on a foam surface with open and closed eyes. We used the standard stance with feet under 30 degrees angle. The postural response was characterized by displacement of the center of pressure. These stabilometric parameters were evaluated from the measurements.

Results: Amplitudes of stabilogram, length and area of statokinesiogram, root mean square of statokinesiogram and amplitude spectra of stabilograms were statistically compared.

Conclusion: According to results of the experiment we can consider the experimental device to be applicable in the rehabilitation of patients in 3D virtual reality for objective evaluation of postural reactions.

Keywords: Posturography, virtual reality, visual feedback, force platform, brain damage

[P-112]

Is Pilates exercise program effective on balance, flexibility and muscle endurance? A randomized controlled study

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Objective: To determine the effect of Pilates mat exercises on dynamic and static balance, hamstring flexibility, abdominal muscle activity and endurance in healthy adults.

Materials-Methods: A total of 51 female healthy volunteer university students joined in 8 weeks Pilates mat exercise program and 47 completed. The participants were randomly assigned into two groups. The Pilates group (n=23) received the Pilates program for one hour two times a week. The control group (n=24) continued daily activities. Dynamic and static balance were evaluated by Sport Kinesthetic Ability Trainer (KAT) 4000 device. Hamstring flexibility and abdominal endurance were determined by sit and reach (SR) test and curl up test respectively. Pressure biofeedback unit (PBU) was used to measure transversus abdominis (TrA) and lumbar muscle activity. Waist circumference and body mass index were also recorded. The physical activity (PA) of the participants was followed by International Physical Activity Questionnaire (IPAQ)-short form. The assessments were performed at baseline, after six and after eight weeks.

Results: There were no significant differences between groups in terms of sociodemographic characteristics and baseline measurements (p<0.050). In the Pilates group, statistically significant improvements were observed in curl up, SR test, PBU scores at six weeks (p <0.001), and KAT static and dynamic balance scores (p<0.001) and waist circumference (p=0.007) at eighth weeks. A comparison between the two groups showed statistically significant better scores in the Pilates group for the SR test (p = 0.010) and PBU (p<0.001) at six weeks, as well as curl up and static KAT at eighth weeks (p <0.001).

Conclusion: An 8-week Pilates training program was found to have beneficial effect on static balance, flexibility, abdominal muscle endurance, TrA and lumbar muscle activity.

Keywords: Pilates, balance, flexibility, endurance, muscle activity

[P-113]

Effectiveness of extracorporeal shock wave therapy for patients with greater trochanteric pain syndrome

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Objective: The purpose of this study is to evaluate the efficacy of Extracorporeal Shock Wave Therapy (ESWT) for patients with refractory greater trochanteric pain syndrome (GTPS).

Materials-Methods: From 2008 to 2012, we have treated 9 patients, aged between 31 and 69 years, 77.8% females and 22.2% males; 66.7% suffering from left GTPS, 22.2% right GTPS and 11.1% bilateral. All the patients reported the appearance of pain among 6 months and 2 years from the beginning of our study; 77.8% of the patients had been treated with NSAIDs, 66.7% with infiltrations and 88.9% with physical therapy; 77.8% had got radiography of the hip, 66.7% ultrasound study and 33.3% MRI. The procedure was based in three sessions of treatment with ESWT, 2000 shocks, energy flux density 0.38 mJ/mm with a break of fifteen days between treatments. A piezoelectric extracorporeal shockwave generator (Piezason 100) was used. Pain has been valued before the session and four months after the treatment with ESWT through Visual Analogical Scale (VAS), defining a categorization of mild pain (VAS 0 to 3), moderate pain (VAS 4 to 6) and severe pain (VAS 7 to 10).

Results: No patient has interrupted the treatment and 55.6% of them had a moderate pain during the therapy. No complications have been reported. Half of the patients that had severe pain at rest prior to the treatment claimed mild pain 4 months after. The patients with severe pain walking prior to ESWT had 20% mild pain and 80% moderate pain after 4 months. A clear reduction of pain was found with the VAS and an increase in functional improvement.

Conclusion: ESWT can be considered a valid alternative to the traditional therapies, above all to surgical therapy, in the treatment of GTPS.

Keywords: Extracorporeal shock wave therapy, greater trochanteric pain syndrome, pain

[P-115]

A rare case in 21th century: Tetanus

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Tetanus is characterized by uncontrollable muscle spasms caused by tetanospasmin released by *Clostridium tetani* on the infected wound. We present a case with generalised tetanus. A 40 years old female was referred with the complaint of difficulty in walking. She was hospitalized for 3 weeks in the intensive care unit (ICU) of a university hospital with the diagnosis of generalised tetanus. Severe muscle contractions were so difficult to control that her feet were in continuous plantar flexion and attempts to position the feet in neutral with ankle foot orthosis (AFO) was unsuccessful, besides pressure sores developed on dorsum of both feet. She was operated by plastic surgery with skin grefts from the thigh when her medical condition was improved. Upon discharge she was referred to our clinic. On physical examination both ankles were in the plantar flexion position, 60° on the right and 50° on the left. Muscle strength of upper extremities were normal, extensor hallucis longus were 2/5, ankle plantar and dorsiflexors could not be evaluated because of the joint limitation, remaining lower limb muscles were 5/5. She was unable to walk alone, only stand up for a while with the help of her husband. We started a rehabilitation programme consisting of hotpack, whirlpool and stretching exercises and ordered adjustable AFOs. On the second week she was able to walk with a walker. Ankle dorsiflexion was -40 on the left and -45 on the right when the legs were extended. Ankle were in neutral position when the knees were flexed therefore botulinum toxin injection was applied to gastrocnemius muscles. Now the patient is able to walk alone in the clinic and still under rehabilitation programme. We would like to emphasize the importance of prevention of joint contractures and pressure sores in the ICUs which reduce quality of life seriously.

Keywords: Ankle contracture, botulinum toxin, tetanus

[P-114]

Effect of botulinum toxin a therapy and Neuromuscular Electrical Stimulation (NMES) in children with spastic diplegic cerebral palsy

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Objective: The aim of this study was investigate additive of neuromuscular electrical stimulation (NMES) on botulinum toxin A injection in ambulant children with spastic diplegic cerebral palsy (CP).

Materials-Methods: Sixteen spastic diplegic children who were treated with botulinum toxin A injections into the both calf muscles were assessed retrospectively. Eight patients were stimulation group who received botulinum toxin A and NMES, eight children control group botulinum toxin A only. Both group underwent conventional exercises program before and after botulinum toxin A injection. The stimulation group received NMES on tibialis anterior 30 minutes a day, 3 days a week for a period of 8 weeks. The Physician Rating Scale, passive and active ranges of ankle motion, modified Ashworth scale were assessed before botulinum toxin A injection and 2 weeks and 2 month after injection.

Results: A significant increase in passive ranges of ankle motion was showed at 2 weeks after injection and 2 month after injection both group. Both group showed significant improvements by the modified Ashworth scale (control group p<0.05) stimulation group (p<0.01). Physician Rating Scale scores were improvement significantly in the stimulation group at 2 month after injection but this was not observed in the control group.

Conclusion: NMES application after botulinum toxin A injection in calf muscles was found walking ability improvement in spastic diplegic children.

Keywords: Botulinum toxin A, cerebral palsy, neuromuscular electrical stimulation

[P-116]

The effects of therapeutic ultrasound on normal and demyelinating nerves

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Objective: Temperature is one of the most important factors affecting on nerve conduction studies. The effects of superficial warming on normal and demyelinating nerves have been well established. However, there is insufficient data to conclude therapeutic ultrasound's deep thermal effects on nerve conduction. The purpose of this study was to determine and compare the immediate effects of continuous wave (CW) ultrasound on healthy and demyelinating nerves.

Materials-Methods: We used carpal tunnel syndrome (CTS) as a model to study the effect of CW ultrasound on nerves with focal demyelination secondary to chronic compression. Thirty-two median and 32 ulnar nerves of the same hands of 25 patients with CTS were investigated. The nerve conduction studies were performed at baseline, 4th minute and at the end of the US application, without changing the positions of the stimulus and recording electrodes. Motor and sensory latencies and conduction velocities of each nerve was recorded. The ultrasound parameters were: 3.3 MHz, 1.0 W/cm², CW, 8 minutes.

Results: The skin surface temperatures were measured with an infrared temperature scanner and were maintained in normal ranges (36,5 C° - 37,2 C°) throughout the study. CW ultrasound application resulted in significantly slower median motor nerve CV and increased ulnar motor latency. There were not any intergroup changes in median and ulnar nerve latencies and CV's statistically.

Conclusion: It is concluded that alterations in nerve latencies and CV's from 3.3 MHz, 1.0 W/cm² CW ultrasound on normal and demyelinating nerves appeared to be not significantly remarkable.

Keywords: Therapeutic ultrasound, nerve conduction, temperature, demyelination

[P-117]

Lumbosacral plexopathy with spontaneous regression

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A 35 year old female presented with right drop foot. Her symptoms began 6 months ago with pain on her right groin. Her pain progressed to involve right leg and weakness on the foot. She admitted to a neurosurgeon and a lumbar vertebral MRI was taken which revealed grade 2 degeneration in L4-5 intervertebral disc. Weakness worsened in few weeks and she was referred to our electrophysiology laboratory. On physical examination she had right drop foot and Trendelenburg gait. Right gluteus medius was 3/5, ilipsoas 5/5, quadriceps 4+/5, tibialis anterior 2/5, extensor hallucis longus 1/5, gastrocnemius 4/5 and hamstrings 5/5. Sensory disturbance was detected on the right L4,5 and S1 dermatomes. Tendon reflexes were normoactive. Electrodiagnostic study revealed severe partial axonal degeneration in L4 and L5 and mild partial axonal degeneration in S1 roots. EMG findings were inconsistent with the lumbar MRI findings therefore pelvis was screened. Pelvic MRI revealed soft tissue densities surrounding lumbosacral plexus and descending along the sciatic nerve with marked contrast enhancement. There was also increase in signal intensity of right gluteus maximus, medius and tensor fascia lata muscles on T2 weighted MR images consistent with indirect signs of nerve injury. Laboratory tests were negative for any inflammatory or infectious disease. Diagnostic biopsy of the lesion was planned but patient rejected the invasive procedure. She was prescribed gabapentin for the neuropathic pain and an orthosis was given for drop foot. She was seen 6 months later with amelioration in her symptoms. Control MRI findings showed mild regression of the soft tissue densities and contrast enhancement, regeneration motor unit potentials in gluteus medius and mild axonal degeneration findings in L4,5 and S1 innervated muscles were found in control EMG. The lesion seems to be an inflammation that could not be revealed by routine laboratory tests.

Keywords: Drop foot, lumbosacral plexopathy, pelvis

[P-123]

Treatment of lateral epicondylitis with kinesiötaping: A randomized, double-blind, placebo-controlled trial

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Objective: To examine whether kinesiötaping (KT) is more effective than placebo in reducing pain in adults with lateral epicondylitis (LE) after 2 weeks.

Materials-Methods: A total of 32 patients with chronic LE were randomized to receive either KT or a Hypafix plaster. The primary end point was a change in pain observed using the Patient-Rated Tennis Elbow Evaluation (PRTEE) questionnaire; grip strength at 2 weeks was also assessed.

Results: Pain reduction at 2 weeks or sooner (primary end point) was observed in KT group, with a statistically significant difference between the groups. Grip strength improved significantly in the KT group at 2 weeks.

Conclusion: KT had a short-term pain-reducing effect at 2 weeks month in contrast to placebo. KT may be an alternative treatment option in the treatment of LE especially when an immediate effect is needed.

Keywords: Kinesiötaping, lateral epicondylitis, tennis elbow

[P-122]

Can kinesiötaping be a choice in cancer rehabilitation? A case report

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In the recent years, kinesiötaping has been used especially for sports injuries and pain management. It is a very useful alternative treatment modality but its effect mechanisms are not known exactly. In addition to pain management, kinesiötaping is very effective in decreasing disability in the lymphedema treatment by creating alternate drainage pathways. We report a case of a 33-year old woman who developed radionecrosis after irradiation following a radical mastectomy and complicated lung adenocarcinoma in the left inferior lobe. Chest wall resection and reconstruction were performed simultaneously with left inferior lobectomy. After chest reconstruction she had severe arm pain at the medial side of the arm during inspiration. There was a brachial plexus metastasis in the MRI. We used kinesiötaping for treatment of pain. After kinesiötaping she started to inspire painlessly. We applied kinesiötaping at baseline, on the 3rd and on the 7th day. In this period she did not report pain. After the last kinesiötaping session she underwent surgery of the brachial plexus and a second pulmonary metastasis. We consider that kinesiötaping may improve quality of life of patients who are suffering from cancer.

Keywords: Kinesiötaping, breast cancer, rehabilitation

[P-124]

Monitoring lymphedema with bioelectrical impedance analysis after breast cancer therapy: Preliminary results

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Objective: Lymphedema is a very common complication of breast cancer therapies and can be treated effectively when detected at early stages. Bioelectrical impedance analysis can detect developing lymphedema as early as 10 months prior to the appearance of any detectable clinical signs. This report gives the preliminary results of lymphedema monitoring of our breast cancer patients using the L-DEX U400® bioelectrical impedance device over a period of one year.

Materials-Methods: The patients, who had been operated with the diagnosis of breast cancer, were prospectively followed for the presence of lymphedema, before the surgery and at 3-month intervals of the year thereafter. Bioelectrical impedance analysis with L-DEX U400® device, tape measurements of upper extremities and trunk edema examination have been conducted by a physical medicine and rehabilitation specialist at each visit.

Results: Twenty-five patients who have been monitored regularly since November 2011 were enrolled to the study. Seven of the 27 patients had sentinel lymph node biopsy, and the rest (20 patients) had axillary dissection. The surgical procedure was breast conservation therapy in 23 patients and mastectomy in the remaining 4. Among the patients who have been followed for one year, 2 patients developed Stage 0, one developed Stage 1 and one had Stage 2 lymphedema with an overall rate of 18%. All the patients suffering from lymphedema had been through axillary dissection. Stage 1 and 2 lymphedema patients were treated with the outpatient complex decongestive therapy program at the physical therapy and rehabilitation clinic. Stage 0 lymphedema patients were prescribed home exercises and were educated on conservative measures. Bioelectrical impedance analysis of the Stage 0 patients revealed normal values within one month.

Conclusion: Bioelectrical impedance analysis is a useful method for the diagnosis of lymphedema at the earliest stage (Stage 0) when no clinical findings can be detected.

Keywords: Lymphedema, bioelectrical impedance analysis, breast cancer

[P-125]

Robot-aided physiotherapy: From passive shoulder-elbow movements to active-assisted reaching and grasping

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Objective: In the scope of the REHAROB-project of the European Union a robotic system has been developed for supporting shoulder-elbow physiotherapy of patients with spastic paresis. The aim of the current research is to enable the REHAROB-system to provide wrist and hand therapy also. In addition, the system would be able to provide impedance support to complex reach and grasp tasks that focus on the practice of daily living activities (ADL).

Materials-Methods: The modified REHAROB physiotherapy system includes two robot arms. The IRB 140 robot of ABB is connected to the elbow through a custom made elbow orthosis. The IRB 1600 robot holds the so called hand module that comfortably accommodates the hand with two Velcro straps. There is a smaller 2 DOFs robotic finger in the hand module (SDH finger of Schunk AG) that moves the thumb. Another of the same type of 2 DOFs robotic finger moves the fingers #2, #3, #4 and #5 through a custom developed load distribution mechanism. The subject is seated in a servo controlled couch during exercises. Five ADL tasks will be practiced with the robot. The zero impedance normal trajectories are recorded for three anatomically defined sizes of the Hungarian adult population. An impedance-based control algorithm adjusts the actual motion of the subject to the ideal normal controls, taking into consideration the pre-set level of assistance. Safety during the physiotherapy is ensured by a number of hardware and software devices.

Results: The ethical approval procedure has been completed. The development is finished, the system is ready for starting the clinical trial with hemiparetic post-stroke patients.

Conclusion: Authors expect that this type of robot-assisted upper limb rehabilitation not only reduces motor impairments but also improves the functional use of the affected upper extremity.

Keywords: Robotics, upper limb, physiotherapy, stroke

[P-128]

Community based rehabilitation: A case study of mainstreaming disability into maternal and child health programs in Bangladesh

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The inter-professional Project on Disability, Maternal and Child Health (IPODMCH) uses community based rehabilitation (CBR) as a strategy for advance mainstreaming of disability to maternal and child health (MCH) at service, education and policy levels. IPODMCH is a three year project implemented by ICACBR, Queen's University, Canada in partnership with Centre for the Rehabilitation of the Paralysed (CRP) in Bangladesh with the funding from the Government of Canada Muskoka Initiative for Maternal, Newborn and Child Health (MNCH). This is the only project that explicitly includes disability in MNCH programming and uses the CBR health component to contribute to the achievement of the Millennium Development Goals, particularly Goal 4 to reduce child mortality, and Goal 5 to improve maternal health.

The baseline study revealed that the consulted stakeholders were interested in participating in the Project as they recognized the relevance of inclusion of disability into MNCH programming. None of the 76 consulted MNCH organizations had any training on disability, although all of them had either personal or professional exposure to disability. They have a basic understanding of causes of disabilities, but not enough knowledge about management of disability and available services. To address these issues, the project was designed to focus on the first four sub-components of health within the CBR Matrix: promotion, prevention, treatment, and rehabilitation. Gender and human rights based approach is fully integrated in all activities. Training of the trainers is used to transfer disability and CBR knowledge. Thirty-eight trainers working in six inter-professional teams from 10 MNCH and six disability organizations delivered 24 workshops for 533 female and 170 male MNCHD service providers. They organized 19 inter-professional days for over 3000 community members. These activities aim to increase utilization of services at the community level, improve referral and increase awareness of men and women about MNCHD services and underlying gender barriers.

Keywords: Community based rehabilitation, maternal and child health, millennium development goals, women and children with disabilities, Bangladesh

[P-126]

Inertial sensing system for advanced chronic condition monitoring and risk prevention

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Objective: Chronic Obstructive Pulmonary Disease (COPD) is the fourth cause of death and will be the seventh cause of disability adjusted years, in 2030, worldwide. COPD is treated with medication and physical exercise. Partners from the Netherlands, Norway and Romania created the Is-Active project with the aim to produce fully functional prototypes of modern persuasive technology able to give real-time support in order to monitor and improve the user's physical condition according to the user's specific medical situation.

Materials-Methods: The Is-Active system consists of a wearable miniaturized inertial sensor node (consisting of 3 accelerometers, 3 gyroscopes and a magnetometer) and a feedback device (dedicated application, running on a smartphone or tablet). The application integrates data from the sensors and answers concerning perceived fatigue and breathlessness, and gives feedback consisting in a motivating graph of physical activity level, and persuasive suggestions. Our research team improved the safety aspect of the system, creating "Is-Active for safety and risk prevention", completed with a pulseoximeter, providing information on the most important risk marker in COPD: oxygen saturation of hemoglobin. The feedback device shows the level of oxygen saturation in a semaphore colored box. A longitudinal field trial was set up with 10 COPD outpatients. Protocol involved free ADL, work and leisure activities. Testing time: 1 month, 7 days a week, from 8 am to 10 pm. Assessment were performed before and after the trial regarding objective functional parameters (6 minutes walking test, medication) and subjective parameters (a questionnaires concerning acceptability and usability of the system, satisfaction and intention to use the system, and perceived levels of dyspnoea, physical activity, fatigue and quality of life).

Results: The system was well accepted and used. After the field trial, distances in the walking test increased by 4.5% on average. Similar results were obtained by the Norway and the Nederland teams.

Conclusion: The Is-Active system proves to be a reliable and safe rehabilitation tool.

Keywords: Persuasive, rehabilitation, technology

[P-132]

Education level is not associated with length of hospital stay in patients after stroke

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Objective: The aim of this study was to evaluate the effect of education level on the length hospital stay in patients with stroke.

Materials-Methods: 196 patients with stroke (94 men, 102 women) attending the inpatient unit were included in the study. The mean age was 61.3 (SD 12.2) years. A retrospective data evaluation included patient history, demographic features and neurological evaluation.

Results: The mean time since the stroke onset was 434.2 (SD 543.7) days. The Brunnstrom motor recovery scale score was 2.63 (SD 1.53) for the upper extremity, 2.30 (SD 1.70) for the hand, and 3.14 (SD 1.48) for the lower extremity at admission. The education level was primary school in 52.6%, high school in 16.3% and more than high school in 31.1% of the patients. No statistically significant correlation was found between the education level and hospital stay ($p > 0.05$).

Conclusion: Education level dose not seems to be significantly associated with the length of hospital stay in patients after stroke in the studied population.

Keywords: Education level, hospital stay, stroke

[P-133]

Possibilities for improvement of patient safety based on a questionnaire survey in Hungary

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Objective: Patient safety has recently become an important topic in Hungary. To foster the improvement of patient safety culture in Hungarian hospitals, limitations and opportunities had to be identified. We designed structured interviews with 13 open-ended questions to gain a better understanding of the topic.

Materials-Methods: Semi-structured interviews were performed with 13 health care specialists (physicians, nurses, insurance experts) and other professionals known for their quality improvement activity. Half of the subjects had considerable health policy experience. The interviews lasted for 1 to 3 hours. The transcripts were then analysed.

Results: All experts suggested that patient safety was an important issue. In their opinion, health workers have limited knowledge of patient safety (12 resp.) and patient safety aspects hardly influence the decisions made in health politics (10 resp.) or by hospital management (13 resp.). The most important area for improving patient safety culture was changing the attitudes and judgments (13 resp.). The main identified causes for failure of the earlier attempts were: lack of education (6 resp.); lack of a suitable approach (5 resp.), shortage of human resources (4 resp.); lack of management knowledge and motivation (5 resp.), and that the activity was limited in time and was not systematic (2 resp.). Financial incentives were not considered important. Patient safety has to be the integral part of the quality improvement systems and a requirement for the hospital to be accredited. Registered nurses might play a main role in spreading patient safety culture (6 resp.). Proper recognition and better prospects could be appropriate motivational tools.

Conclusion: Good communication and training at every level of expert education should be in place. Based on the experts' opinion we suggest applying appropriate indicators, introducing government regulations and transparency, developing human resources, and setting good perspectives.

Keywords: Patient safety, structured interview, health policy

[P-135]

Assessment of therapeutic effects and postural responses of two methods of balance training on elderly patients

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Objective: Low back pain is often a cause of altered trunk muscle function. It has been shown that balance training can be more efficient for muscle group strengthening than individual muscle exercises. The goal of this research was to determine whether the choice of balance training method had any influence on the overall therapeutic effect and does it affect postural responses on elderly patients.

Materials-Methods: Balance training was applied within the context of comprehensive therapy for 11 patients aged from 45 to 70 with low back pain in duration of 2 weeks, 5 times a week. Six patients used the Gamma trainer supporting virtual reality games and five patients used the wobble board for balance training. A device designed for perturbation at the pelvis level with a force plate to measure the center of gravity was used to assess postural responses before and after the therapy. At the same time test of functional reach and test standing on a single leg were carried out. Statistical analysis included 2-way ANOVA to analyze the therapeutic effects and the influence of using two different kinds of balance training methods.

Results: Improvement of functional reach test after balance training was significant ($p = 0.0215$) and was also significant for each group ($p = 0.0419$), while differences between the groups were not found to be significant ($p = 0.1257$). Standing time on a single leg increased but the improvement was not significant. Five patients also improved their postural responses.

Conclusion: In spite of the small number of patients involved we may conclude that balance training is important for trunk muscle strengthening in patients with low back pain regardless of the choice of balance training method.

Keywords: Low back pain, postural responses, balance training, wobble board

[P-134]

The UN-convention on the rights of people with disabilities and the transition from school to vocational training and career in Germany

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Objective: By signing the United Nations Convention on the Rights of Persons with Disabilities in 2009, Germany recognizes any form of physical, emotional, mental or sensory impairment as normal aspects in human life. Theoretically, within the framework of existing measures, people with disabilities should have the same opportunities as non-disabled, but in reality the target group still faces several problems. Difficulties in achieving equal participation in the labour market are the crucial example in this context. Therefore, it is essential to understand the school-to-work transition of young people with disabilities.

Materials-Methods: The different systems are analyzed through existing official data sources on schooling, vocational rehabilitation and labour market. A descriptive analysis of the different sources is carried out

Results: Every year a large number of pupils with disabilities leave school without secondary school qualification, and even those who graduate successfully face difficulties in entering the labour market. As a result, a variety of measures to qualify the target group and to get them into vocational training programs is provided. The individual biographies of this target group are hard to verify through existing official data. In general, it is difficult to identify young people with disabilities within these systems.

Conclusion: Considering the well-differentiated systems for young people with disabilities in Germany, the challenges in statistical analyses are explicable. A better quality of data could be achieved by matching the data of the educative with the data of the rehabilitative system. Internationally recognized standards for the identification of the target group could be implemented to permit comparison by objective criteria.

Keywords: Transition, United Nations, conventions, vocational training

[P-136]

Effects of rehabilitation in persons with mental disabilities

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Objective: The aim of our work was to assess the role and significance of a rehabilitation team consisting of a specialist in physical medicine and rehabilitation, a nurse, a physiotherapist, a kinesiologist and an occupational therapist in the rehabilitation of motor deficiencies in persons with mental disabilities. Due to mental retardation and the accompanying deficiency of the locomotor system, these patients are accommodated in a special rehabilitation centre, because that they cannot function independently outside the protective environment that the centre provides. We evaluated the clinical and functional status of the locomotor system in 39 patients with mental disabilities and assessed the degree of motor impairment ranging from minor coordination disorders to tetraparesis.

Materials-Methods: After establishing the degree of independence in daily activities for each individual patient using the Barthel Index and the Katz Index, we defined the individual therapeutic plans adapted to the mental disability of each individual and the degree of their cooperation. The fundamental aim of the planned effects of rehabilitation was to improve the existing and prevent further functional impairments, to develop and improve the mobility and the ability of the patients to care for themselves within the limits of their psychophysical capacity. The twelve-month systematic treatment included physiotherapy, kinesiotherapy, occupational therapy, therapeutic riding, Pilates and sports and recreational activities. The therapeutic effects were assessed using Barthel Index and Katz Index.

Results: We found a retained pre-existing functional status with no further deterioration in 31 patients and we observed a higher degree of independence in 4 patients.

Conclusion: The findings emphasise the importance of the rehabilitation team in terms of maintaining and improving the psychomotor status and achieving a higher degree of independence in everyday activities and better psychosocial integration for persons with mental disabilities.

Keywords: Mental retardation, motor disabilities, rehabilitation team, barthel index, katz index of independence in activities of daily living

[P-137]

A retrospective study of the impact and prevalence of static and dynamic spinal changes in active people and the benefits of a rehabilitation program

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Objective: In the recent years we have observed a significant increase in the number of active patients with both static and dynamic spinal disorders. These patients perform activities that require prolonged monotonous positions and favor a sedentary lifestyle. A large number of these patients are young (25-45 years). Through this study we wanted to identify the most appropriate therapeutic and preventive methods.

Materials-Methods: The study included the patients treated in our clinic during a period of 6 months (March-August 2012), 380 in total. The age of the patients was between 25 and 45 years, 240 were women and 140 were men. 150 had scoliosis, 56 had kyphosis, 34 had kyphoscoliosis and 140 had disc-related pathology. The patients were assessed from clinical and imaging point of view at the beginning and at the end of the rehabilitation program. Pain (using VAS) and activities of daily living were also assessed. We divided the patients into two subgroups: 190 patients who received a complex rehabilitation program (consisting from electrotherapy and kinesiotherapy), and 190 patients who received only kinesiotherapy. The rehabilitation program was conducted for 2 weeks.

Results: In both groups we observed an improvement in all the assessed parameters (90% of the patients reported an improvement on the VAS). Only 1% of the patients did not complete the assessment and the rehabilitation program.

Conclusion: Most patients noticed an improvement in their quality of life and most of them continued the kinesiotherapy program at home. This study shows that we need to improve the existing prevention methods through the education starting from school.

Keywords: Rehabilitation, active patients, prevention

[P-139]

Efficient case management in the German social accident insurance

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Objective: The rehabilitation management of the institutions of the DGUV (German Social Accident Insurance) uses different instruments to enable a quick and efficient rehabilitation process after work accidents. On behalf of the patients the reduction of absence times is a fundamental goal.

Materials-Methods: Under the leadership of the FSA GmbH together with the German Social Accident Insurance for the food and catering industry (Berufsgenossenschaft Nahrungsmittel und Gastgewerbe – BGN) most statutory accident insurances make use of the so-called Weller table. This is a management system providing prognosis for the duration of the treatment based on the data on injuries with confirmed diagnosis. On the basis of evaluations of previous cases the prognosis data are constantly updated taking into consideration medical expertise from an expert group and adjusted to the latest practical and scientific progress (it is a “learning system”). The Weller table gives information about necessary medical treatment to the case manager and proposes measures. Our aim is to present the Weller table for communication with rehabilitation experts from all over Europe.

Results: Between 1999, when the Weller table was implemented, and 2006 the average number of days with disability (absence from work) decreased by 25%.

Conclusion: Continuous evaluation in cooperation between medical experts and insurance managers is an instrument of applied research to improve the rehab management processes including training contents.

Keywords: Rehabilitation management, social insurance, Weller table

[P-138]

Upper extremity problems in hemodialysis patients

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Objective: The aim of this study was to investigate upper extremity musculoskeletal problems in hemodialysis patients with arteriovenous fistula (AV fistula); and also to compare the arm with fistula with the arm without fistula based on the disability and pain

Materials-Methods: Hemodialysis patients with AV fistula were compared with the healthy controls. The ages, gender, occupation, the duration of dialysis, patients' upper extremity complaints and physical examination findings were recorded. Additional imaging and neurophysiological tests were performed when necessary. Visual Analog Scale (VAS) was used for pain analysis and Disabilities of Arm, Shoulder and Hand (DASH) Survey for upper extremity disabilities.

Results: Mean age was 54.0 (SD 15.9) years in the study group (n=150) and 54.9 (SD 15.8) in the controls (n=130). Fistula formation duration was 4.2 (SD 3.0) years. In the study group mean DASH was 20.60 (SD 15.61) and mean VAS was 2.08 (SD 2.06); mean DASH was 5.63 (SD 10.35) and mean VAS was 0.44 (SD 1.31) (p < 0.001) in the control group. The upper extremity musculoskeletal complaint and disease rates were 53%, 26% in the study group and 20%, 7% in the controls, respectively (p < 0.001). The rest of the results were as follows: musculoskeletal complaints: 43%, musculoskeletal disease: 21%, mean DASH: 33.11 (SD 9.45) and mean VAS: 2.08 (SD 2.06) in the arm with fistula; musculoskeletal complaints: 24%, musculoskeletal diseases: 12%, mean DASH 19.51 (SD 14.72) and mean VAS 1.60 (SD 1.91) in the arm without fistula (p < 0.05).

Conclusion: The upper extremity musculoskeletal diseases are common in the hemodialysis patients. These problems adversely affect the patients' self-sufficiency and the life quality. Furthermore, AV fistula increases the disability and the diseases of the involved arm.

Keywords: Hemodialysis, arteriovenous fistula, disabilities of arm- shoulder and hand

[P-140]

Influence of elastic lumbar belts on the effect of a muscle strengthening program for patients with low back pain

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Objective: Aim of the study was to evaluate the influence of elastic lumbar belts on the effect of muscle training for patients with low back pain.

Materials-Methods: 104 male subjects aged from 23 to 42 years with and without low back pain participated in the investigation. The low back pain patients (n = 68) were randomized into a training group without and a training group with elastic lumbar belts and a control group. The subjects with healthy backs (n = 36) were divided age-matched into a training group with elastic lumbar belts and a control group. The three training groups took part in a muscle strengthening program over 8 weeks. The control groups did not receive any alternative physiotherapeutic treatment. All groups were tested at the beginning, after 8 weeks and further 6 months later.

Results: The data obtained for the control groups remained virtually unchanged over the period of investigation. However, a significant increase of the muscle flexibility of the lower limbs could be proved for all training groups. Furthermore both coordination between the lumbar spine and pelvis when flexing the trunk deeply forward and strength of the trunk musculature was more leveled out for the training groups with patients suffered low back pain. The results confirmed a reduction for pain severity and for limitations in activities of daily living as well. The modifications for the criteria investigated were significant stronger for the training group with patients using the elastic lumbar belt.

Conclusion: The effectiveness of the muscle strengthening program for patients with low back pain could be improved significantly by means of the elastic lumbar belt as an applicable therapy instrument in the functional rehabilitation of spinal disorders.

Keywords: Low back pain, rehabilitation, muscle strengthening, elastic lumbar belts, outcome

[P-141]

Evaluation of effectiveness of rehabilitation of patients with Guillain-Barre syndrome in an early stage

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Objective: To evaluate rehabilitation process and the factors affecting rehabilitation effectiveness of patients with Guillain-Barre syndrome (GBS) in an early rehabilitation stage.

Materials-Methods: 31 adults of both gender with GBS: 16 (51.6%) were in the age group up to 60, 15 (48.3%) were in the age group over 60. Rehabilitation effectiveness was evaluated using the Functional Independence Measure (FIM).

Results: In the age group up to 60 years mean FIM at the start of rehabilitation was 60.7 (SD 3.5) and after rehabilitation it was 89.6 (SD 5.9) ($p = 0.001$). In the age group over 60 years mean FIM at the start of rehabilitation was 58.7 (SD 3.4) and after rehabilitation it was 79.1 (SD 5.5) ($p = 0.001$). In the age group up to 60 years diabetes was present in 31.3%, arterial hypertension in 25%, urinary tract infection in 18.8% of the patients. In the age group over 60 years heart failure was present in 33.3%, arterial hypertension in 26.7%, chronic atrium fibrillation in 20.0% and urinary tract infection in 33.3% of the patients. Early rehabilitation took on average 42.0 (SD 3.2) days.

Conclusion: The analysis of activity of patients with GBS showed improvement of functional status in both age groups. Complications for the patients with GBS showed a negative impact on the effectiveness of rehabilitation.

Keywords: Rehabilitation, Guillain-Barre syndrome, complications

[P-143]

Psychometric testing of the evaluation of daily activity questionnaire in osteoarthritis in the United Kingdom

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Objective: The Evaluation of Daily Activity Questionnaire (EDAQ) is a patient reported measure of activity limitations developed in Sweden. We previously revised and tested this in rheumatic arthritic in the UK. It includes 14 domains (Eating; Personal Care; Dressing; Bathing; Cooking; Moving Indoors; House Cleaning; Laundry; Transfers; Moving Outdoors; Communication; Household Maintenance; Caring; Leisure), each split in two sections: A scores activity performance without aids, alternate methods or help; and B performance with aids or alternate methods. Items are scored 0-3 (no difficulty to unable). Domains can be used separately. Validity and reliability of the EDAQ in osteoarthritis (OA) were evaluated.

Materials-Methods: Participants from 18 rheumatology clinics completed postal questionnaires including demographic questions, EDAQ (UK), Health Assessment Questionnaire (HAQ) and SF36v2; repeating the EDAQ three weeks later. Spearman's correlations (r_s) were used to evaluate construct validity of domains with other measures and test-retest reliability of domain scores. Cronbach's alpha was used to evaluate internal consistency.

Results: 184 participated: 143 women; mean age = 64.51 years (SD 10.62); mean OA duration = 10.43 years (SD 10.24). Most domains correlated moderately ($p < 0.001$) with HAQ: $r_s = 0.50-0.83$; SF36v2 Physical Function: $r_s = -0.45$ to -0.87 ; SF36v2 Bodily Pain: $r_s = 0.40-0.65$; SF36v2 Vitality: $r_s = -0.3$ to -0.58 . The Eating and Communication domains had only weak, but significant ($p < 0.01$), correlations with these, as few had difficulties with these. The Caring correlations were insignificant as activities were inapplicable for 53-83% of the participants. Internal consistency was high in all domains (Cronbach's alpha = 0.82-0.95). Test-retest reliability of scores was good for 11 domains ($r_s = 0.72-0.89$), moderate for two ($r_s = 0.61-0.69$) and insignificant for Caring ($r_s = 0.10$).

Conclusion: The UK version of the EDAQ is a valid and reliable measure of daily activity in people with OA (apart from the Caring domain which needs testing in a larger sample). The EDAQ can be used in OA in clinical practice and research.

Keywords: Patient -reported outcome measures, daily activities, osteoarthritis, occupational therapy

[P-142]

Aquatic functional training in the therapy of conservatively treated diseases of the rotator cuff due to degeneration

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Objective: Assessment of the effectiveness of an aquatic functional training in the rehabilitation of conservatively treated diseases of the rotator cuff due to degeneration.

Materials-Methods: In the frame of a prospective comparative study for evaluation of three kinds of physical treatment the functional adaptations of 42 male patients aged 52 to 62 years were investigated. The patients were randomised into three treatment groups carried out an outpatient therapy program with physical applications five times weekly each time 60 minutes over a period of 10 weeks. The standard group got only applications of the physical therapy. The program of the land group was supplemented by a muscle training on machines for 60 minutes per therapy unit. Apart from physical therapy the water group carried out additionally an aquatic functional training each time twice 30 minutes. The three groups were tested at the beginning (T1), at the end (T2) and three months after T2 (T3).

Results: In comparison with results in T1 the data obtained by means of ANOVA demonstrated significant improvements for the dynamic maximum strength in internal and external rotation ($p < .05$), the functional status of the shoulder (Constant score; $p < .01$) and the health-related quality of life (SF-36; $p < .01$) in all groups both in T2 and mainly in T3. The strongest as well as most stabilized positive effects of the intervention carried out were evaluated for the patients in the water group.

Conclusion: Accommodative resistance and physical properties of the medium water induce strengthening of the muscles in a gentle way and an improved function of the shoulder. The aquatic functional training does not represent only an alternative kind of treatment, but seems to be one of the most promising methods in the therapy of the conservatively treated diseases of the rotator cuff. Further investigations have to evaluate long-term effects.

Keywords: Rehabilitation, diseases of the rotator cuff, degeneration, aquatic functional training

[P-144]

Adhesive capsulitis: A comparative study between the diabetic form and the idiopathic form

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Objective: To study the evolution under rehabilitation of shoulder capsulitis and to identify predictive factors of outcome for diabetic adhesive capsulitis compared to the idiopathic one.

Materials-Methods: A retrospective study of the records of patients treated between 2004 and 2012 for adhesive capsulitis in a department of physical medicine and rehabilitation.

Results: From 182 records, we recruited only 63 in which data were complete. The mean age of the studied population was 55,7 years, 26 men and 37 women. The diabetic capsulitis group (DC) included 34 patients and the idiopathic capsulitis group (IC) included 29 one. The two groups were comparable in terms of age, gender, treatment used, clinical data and functional score (Constant) at baseline. Only the duration of pain was significantly higher in DC group ($p = 0.04$). At the first control, the improvement of the shoulder range of motion and of the pain were significantly better in the group IC ($p < 0.05$). In this same group the Constant score was significantly better in the second control. The improvement of the shoulder mobility ($r = 0.43$, $p < 0.05$) and of the function ($r = 0.34$, $p = 0.006$) was correlated with the decrease of the pain.

Conclusion: The main objectives of the management of adhesive capsulitis, whatever its etiology, are reduction of pain and improvement of upper limb function. These objectives were achieved faster in idiopathic capsulitis compared to the diabetic one. A high duration of pain in diabetic patients seemed to be predictive of a worse functional outcome.

Keywords: Diabetic adhesive capsulitis, idiopathic adhesive capsulitis, rehabilitation, functional outcome

[P-145]

Development and initial psychometric evaluation of the mobility activity measure (Mobam-in) for inpatient rehabilitation settings

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Objective: To evaluate a set of mobility activity measures constructed within the framework of mobility activity domains of the International Classification of Functioning.

Materials-Methods: We developed a set of items for each of five activity domains of Mobam-in: changing and maintaining body position involving sitting and/or lying; changing and maintain body position involving standing up; carrying, moving and handling objects using the hand and shoulder; carrying, moving and handling objects using the hand and/or forearm; and walking and moving. These conceptual domains belong to a previous instrument called Mobam-out (Mobility Activity Measure for Outpatient Rehabilitation Settings). Self-reported data were collected by a questionnaire with a convenience sample of inpatients belong to a French rehabilitation hospital. Psychometric analyses were conducted to test assumptions underlying the scaling and scoring of Mobam-in scales and to evaluate reliability and validity.

Results: A 30-item questionnaire was constructed. In general, analyses supported assignment of items to hypothesized domains. Dimensionality of 5 factors was verified by confirmatory factor analyses and scaling assumptions were met for each dimension. Thus all items correlated significantly more with the hypothesized scale than with scales measuring other domains (item discriminant validity). Internal consistency coefficients did not differ significantly between domains (0.85-0.95). Rasch scaling and modified parallel analysis supported the unidimensionality. Principal components analysis supported the extraction of two high-order factors to these five factors: lower and upper extremity. Therefore, two summary measures, lower and upper extremity, can be constructed from the five Mobam scales.

Conclusion: The framework of used domains and psychometric methods were valuable in developing a mobility activity measure for inpatient rehabilitation settings. Mobam-in is a promising new self-report measure of mobility activities for inpatient rehabilitation settings. Both Mobam-in and Mobam-out provide an opportunity to estimate functioning along a common metric for use across the continuum of rehabilitation care.

Keywords: Rehabilitation, outcomes, mobility limitations

[P-146]

Mineral water for correction of stress-induced homeostatic disturbances in rats

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Objective: It is established that stress causes disturbances of homeostasis. The aim of our study was to create an animal model of physiological consequences of long-term psychological stress, and to evaluate natural mineral water as a factor to address these.

Materials-Methods: To create long-term psychological stress we used a restraint model in rats (3 hours a day for 30 consecutive days).

Results: We observed statistically significant ($p < 0.05$) elevation if the rats' blood levels of 11-oxy corticosteroids, malondialdehyde (MDA - marker of oxidative stress), middle molecular weight peptides (MMWP - marker of waste product toxicity), and leucocytes intoxication index (LII - marker of stress reaction in blood) in comparison to intact rats. These changes implicate that psychological stress causes endogenous intoxication in rats. Additionally under stress we found an increase in duration of thiopental sleeping time test (indirect indicator of activity of phase I CYP450-dependent detoxifying pathway in the liver), and an increase in non-conjugated bilirubin plasma level (phase II) that correlates with stress-induced inhibition of hepatic detoxifying function. Immune system was also involved in stress response in rats. We observed a statistically significant ($p < 0.01$) increase in plasma concentration of circulation immune complexes (CIC), whereas T-lymphocytes, active phagocytes and heterophile antibodies were decreased. To prevent stress-induced homeostatic disturbances leading to endogenous intoxication, we tested mineral water intake in rats undergoing restraint stress. Low mineralization (2,5 g/l) sodium chloride water was administered intragastrically via a feeding tube (in a volume 1% of rat body weight) every consecutive day from day 15 to 30 of the stress model. We observed normalization of MMWP, LII, MDA, CIC and detoxifying functions of hepatic and immune systems.

Conclusion: Mineral water intake may have a role in rehabilitation and treatment of stress-induced endogenous intoxication.

Keywords: Endogenous intoxication, restraint stress, animal testing, mineral water intake rehabilitation

[P-147]

The The impact of upper limb impairment on performing activities

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Objective: Persons with upper limb impairment have difficulties in performing activities that they consider important. The aim of our study was to assess how, and to what extent does the impairment of upper limbs affect carrying out the desired activities.

Materials-Methods: The study included 21 persons (11 women and 10 men, aged 34-87 years, mean age 51 years) who were admitted to inpatient rehabilitation with upper limb impairment. Upon admission and discharge, all participants were assessed using the Southampton Hand Assessment Procedure (SHAP) and their grip strength was assessed with a manual dynamometer. A semi-structured interview was used for defining activities with problems; these were classified into three groups: work/productivity, self-care and leisure.

Results: Before rehabilitation, the Index of Function score obtained with SHAP was below the normal level on at least one hand in all participants, and on both hands in 14 participants. Neither at admission nor at discharge did the Index of Function statistically significantly differ between the dominant and the nondominant hand (both $p > 0.70$), but on both hands it statistically significantly increased at discharge as compared to admission (both $p < 0.05$). The same pattern was observed for grip strength (both $p > 0.80$ and both $p < 0.001$, respectively). In the interview, the participants most frequently reported difficulties in the fields of work/productivity (18 participants, 28 activities in total; mainly housework, e.g. cutting when cooking, ironing and sewing, and physically demanding job tasks, e.g. carrying loads) and self-care (15 participants, 26 activities in total; mainly unbuttoning, un-/zipping, taking shoes on/off and eating).

Conclusion: Our results indicate that upper limb impairment affects gripping ability and the ability of performing several activities in the fields of self-care, work and productivity. This needs to be considered when we design occupational therapy and comprehensive rehabilitation programs.

Keywords: Upper limb impairment, assessment, grip strength, activities of daily living

[P-150]

Use and benefits of the Reha-Statistics-Database (RSD) of the German pension insurance: patients' socio-medical development in a two-year-follow up after medical rehabilitation

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Objective: The major part of the German population is insured with the German Pension Insurance, which is mainly aiming to preserve earning capacity. The data routinely collected by the German Pension Insurance are recorded in the so called Reha-Statistics-Database (RSD). The RSD is a standardised set of process generated data, generated annually as a longitudinal survey over a period of eight years. The RSD contains personal data regarding medical and vocational rehabilitation, pensions, times of employment, unemployment, incapacity to work and sociodemographic data. Given a specific two-year-follow-up after medical rehabilitation these longitudinal data can provide a comprehensive analysis in regards to rehabilitation, employment and pension in terms of a patient's sociomedical development. This study explains the method of data collection and analysis in the RSD using a current 2-year-follow-up (2008-2010) after medical rehabilitation as an example.

Materials-Methods: The data set used is generated from the Reha-Statistics-Database of the German Pension Insurance from the time interval of 2003-2010 and, more specific, in regards to the 2-year-follow-up from records of the years 2008-2010 (N=716.236). The data are evaluated and analysed regarding relevant socio-medical aspects of insured persons within a time period of two years following medical rehabilitation, including payment of pension insurance contributions, reduced earning capacity pension, old age pension and death.

Results: The example shows that over the period 2008-2010 71% of the patients pay their pension insurance contributions on a regular basis and 15% on an irregular basis, 9% received reduced earning capacity pension and 4% old age pension and 1% died. Overall results show that the by far the highest percentage of patients after medical rehabilitation preserve their earning capacity.

Conclusion: Using routine data from the RDS the German Pension Insurance is able to generate a multitude of statistical analyses which allows us to shape our actions accordingly.

Keywords: Pension insurance, rehabilitation, earning capacity, database

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Research in rehabilitation: Use of a validated scale for the measurement of patient satisfaction

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Objective: The evidence-based medicine (EBM) and continuous quality management (CQM) are important concepts based on the adoption of the Clinical Governance (CG) instruments. The CQM has been recently introduced in healthcare as a core element for the achievement of health organization mission. Even if the success of an organization and the level of provided services seem to be associated, few reports are available on validated instruments measuring perceived quality and customers involvement in rehabilitation. Objective is to measure customer satisfaction in patients admitted to rehabilitation at Centro Ortopedico di Quadrante Hospital (Italy), using a validated multidimensional questionnaire (Monnin and Perneger 2002) highlighting the potential and limits.

Materials-Methods: We conducted a survey, using the self-administered questionnaire, to a consecutive sample of 184 hospitalized patients (121 women, mean age 71.7 years, SD 9.2) who received physical therapy after hip/knee prosthesis. The data obtained were analyzed using descriptive statistics measures.

Results: Overall, 111 of 184 patients (60.3%) responded. All items scored very positive (average of 96%), least negative (average of 1%), and neutral for an average of 3% of respondents. Among the aspects more positively evaluated we highlight: atmosphere (99.5%) quality and comfort (97.0%); items negatively evaluated and improvable are courtesy and helpfulness of secretary (2.0%), administrative procedures (2.0%) and quality of information received at the end of treatment regarding the future (2.5%).

Conclusion: The 14-item instrument is planned to be used in our clinical environment. It shows a good level of satisfaction of the evaluated inpatients and allows us to direct future improvement plans. Because the number of studies about perceived quality in rehabilitation is not large, this questionnaire could fill the gap, being able to quantify all aspects related to quality and at the same time being flexible enough to be used in different settings.

Keywords: Clinical governance, customer satisfaction, scales, evidence-based practice, rehabilitation

[P-151]

Implementation of nutrition rehabilitation by different rehabilitation institutions

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Objective: A healthy diet plays an important role in prevention the risk of many diseases (obesity, heart diseases, type 2 diabetes etc.) and in sustaining functional abilities and quality of life. The key objective of this study was to discover how nutrition rehabilitation (nutrition counselling and food service) is implemented by the rehabilitation providers.

Materials-Methods: The study was carried out as an electronic Digium questionnaire. It was emailed to 55 rehabilitation institutions, in which rehabilitation services organised by Kela (The Social Insurance Institution of Finland) were arranged. The form was filled in and returned from 91% (50) of the institutions.

Results: Nutrition counselling was included in the course programme in 90% (45) of the institutions. It was given mainly by registered dietitians (80%). In many places it was given also by other health personnel e.g. by public health nurses, nurses and/or physicians. The most central topics of counselling were 1) healthy living habits, 2) weight control; balancing energy intake and expenditure, 3) having a meal at regular intervals 4) adequate intake of dietary fibre and 5) recommended amount and quality of fat. Meal service corresponded well or rather well nutrition counselling and recommendations in about 50% of institutions. Healthy meal was exemplified one way or another in 66% of institutions. "The food plate model", which gives simple advice on how to build a recommended nutritious meal, was on view only in 26% of institutions.

Conclusion: Principal ways to upgrade the food service in rehabilitation institutions are to improve the quality of fat and decrease amount of salt in food preparation. "The plate model" should be on view in all institutions. The results can be utilized in the development of the nutrition rehabilitation and in the drafting of standards guiding the counselling.

Keywords: Food service, nutrition counselling, nutrition recommendations, rehabilitation institutions

[P-152]

Limits and impact of urinary infections in the rehabilitation program

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Objective: Complex rehabilitation has among its main objectives the aim to restore the functionality of the body segment affected by disease so that the patient regains the ability to perform the activities of daily living and has a better quality of life. Urinary tract infections, which interfere with the rehabilitation process, are frequently encountered in clinical practice.

Materials-Methods: We analyzed the data on patients admitted to our clinic from July to December 2012 – a total of 640 patients, 364 patients with stroke, 80 patients with spinal cord injury (SCI) with tetra- or paraplegia, and 196 patients with posttraumatic diseases or arthritis. The patients were divided into two subgroups: group I (386 patients) with history of urinary tract infections before the disease (stroke, traumatic brain injury, SCI) and group II (254 patients) with no urinary infections before the disease. 24 patients from the first group were using a permanent urinary catheter. The patients were assessed from clinical and functional point of view. We performed urinalysis, urine culture and antibiogram. All patients were evaluated with pelvic ultrasound. They received a complex rehabilitation program for 2 weeks.

Results: In group I we observed that 232 patients had urinary infections with a known germ, but with no sensibility to the tested antibiotics. 36 patients from this group had clinical symptoms but no germs in the urine culture. In group II, 104 patients had urinary infections with a known germ but no sensibility to the tested antibiotics; 14 patients from this group had clinical symptoms but no germs in the urine culture.

Conclusion: The urinary infection is a known risk factor especially for the patients with neurological deficit because of the increased level of spasticity. The presence of urinary infection can interrupt the rehabilitation program because of the symptoms (fever, dysuria, pollakiuria).

Keywords: Rehabilitation, urinary infection, functionality, disease

[P-154]

Comparison of effects of two different quadriceps strengthening exercises on balance

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Objective: Balance is a complex function of numerous neuromuscular processes which include sensory, motor, and integrated components. Lower extremity muscle strength is main component of balance. This study aimed to determine the effects of two different quadriceps strengthening exercise approaches on static and dynamic balance in healthy female subjects.

Materials-Methods: 40 volunteer female university students participated to this study. The average age was 21.6 years (SD 1.7). The participants were randomly assigned to either isokinetic exercise (IE) or progressive resistive exercise (PRE) group. They have never exercised in this way before. Sociodemographic and clinical characteristics of participants were examined. The balance tests were performed with the Sport-KAT 3000 before and after the training. The subjects performed static and dynamic balance tests consecutively. Cybex 770 norm isokinetic dynamometer was used for isokinetic training. Each exercise session was carried out with three settings of 10 repetitions at 60°/s, 90°/s, 120°/s and 180°/s. The rest interval between sets was 30-s. Progressive resistive quadriceps exercises were performed according to Delorme technique, by adding weights to arrive at the ten-repetition maximum (10RM) of each exercise with percentages of the 10 RM (ie, 50%, 75%, and then 100%). Both isokinetic and progressive resistive exercises training were performed three times a week for two weeks.

Results: We found that there were statistically significant differences after the exercise training in both groups as compared to the status before the training. Static and dynamic balance were increased ($p < 0.05$). But there were no statistically significant differences in static and dynamic balance either before or after the strengthening program between the two groups ($p > 0.05$).

Conclusion: Our results show that both isokinetic and progressive resistive exercises cause an increase of balance. Neither of the two quadriceps strengthening exercises showed superiority to the other in healthy female subjects. Further studies with larger samples are warranted.

Keywords: Isokinetic exercises, progressive resistive exercises, balance

[P-153]

Clinical application of accelerometer in rehabilitation

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Objective: Rehabilitation of patients after brain damage is a multidisciplinary, complex, intensive, long-term and individual process. Often, motor disorder post brain damage results in hemiparesis and causes impairment of upper arm movement pattern. The aim of the study is to demonstrate that an accelerometer is a suitable instrument for objective monitoring of impairment of the upper arm movement pattern.

Materials-Methods: A clinical study was undertaken with selected patients after brain damage with central hemiparesis. The patients attended a rehabilitation day care center for 4 weeks. Selected brain damage patients with hemiparesis were divided into 2 groups, with and without monitoring of accelerometer during 4 weeks of special multidisciplinary rehabilitation. The followed criterion was daylong activity of paretic upper arm.

Results: The results confirmed the hypothesis that an accelerometer is a suitable instrument for detecting movement activity of the paretic upper arm. The group of patients with accelerometer showed significant improvement in the daylong activity of the paretic upper arm movement pattern after 4 weeks of special multidisciplinary rehabilitation. Accelerometer is a possibility how to improve the motivation of the brain damage patients because it is a type of visual feedback.

Conclusion: Movement ability of the upper arm is crucial for self-sufficiency, activities of daily life and maintaining an independent family life. The future of rehabilitation is in using of new modern objective functional instruments and technology and cooperation with biomedical engineers, technical experts.

Keywords: Accelerometer, brain damage, movement pattern

[P-155]

Unmet service needs of people with neurological diseases and disabilities – A national survey in finland

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Objective: Finnish social and health service system is fragmented and cross-sectorial coordination is often missing. We examined current housing, service use and unmet service needs among people with neurological diseases or disabilities for the first time in Finland.

Materials-Methods: National questionnaire was sent to 1 482 16-64 year old disability beneficiaries with neurological diagnoses: ischemic attack, brain injury, CP, epilepsy, MS, Parkinson, muscle disease. The sample was drawn from the Social Insurance Institution's registry.

Results: The response rate was 53% (N=780). 73% lived in private flats or houses, 7% in their childhood homes, 3% in supported housing, 15% in sheltered housing and 2% in institutional care. Majority (94%) used at least one service, on the average five services (range 1-17). The most commonly used services were assistive technology (79%), transport services (60%) and rehabilitation (56%). A half had received housing alterations, devices and facilities. A third used personal assistance. Most (78%) of respondents used services specially granted for people with disabilities. 57% reported lack of one or more service, mostly services delivered for home and housing alterations. 33% needed some disability service and 42% further help in their everyday activities. Respondents living independently without any home care or assistance had most unmet service needs. Both unmet service and help needs were in particular identified among persons with cognitive limitations. Most help needs were reported by respondents with low physical functioning and persons living in institutional care or sheltered housing.

Conclusion: Unmet service or help needs are common among people with neurological disabilities, especially among those with cognitive limitations. People lack information about the services and their rights. The service system should better recognize and respond to the service needs of people with neurological disabilities and cognitive limitations.

Keywords: Housing, service use, service needs, neurological disability, survey

[P-156]

Article 26 of the un convention on the rights of persons with disabilities – Habilitation and rehabilitation: Monitoring policies in Italy

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Objective: Analysis of the relevant Italian national and regional norms related to the article 26 of the UN Convention on the Rights of Persons with Disabilities (UNCRPD), evaluation of good practices and liking of article 26 to the ICF biopsychosocial model for monitoring how the rights are respected. The UNCRPD affirms in article 26 that “States Parties shall organize, strengthen and extend comprehensive habilitation and rehabilitation services and programmes, particularly in the areas of health, employment, education and social services”.

Materials-Methods: Collection of all national norms on rehabilitation and habilitation was carried out by the Institute of International Legal Studies; working group with representatives from all Ministries, scientific societies, DOPs members of the National Observatory on the Condition of Persons with Disabilities took place.

Results: The habilitation and rehabilitation of persons with disabilities in Italy are disciplined by law 833/78, law 104/92 and law 328/00, which, consistently with article 26 of the UN Convention, guarantee the socio-sanitary integration of the individual therapeutic project. A well-known problem of habilitation and rehabilitation concerns the non-homogeneous distribution on the national territory. The Ministry of Health has published the Guidelines for Rehabilitation in order to share principles, experiences and action strategies. The new 2010 plan for rehabilitation introduces the new Bio-Psycho-Social Model (ICF): Clinical Government - Rehabilitation Department; Single Rehabilitation pathway - Rehabilitation Network; interdisciplinary approach; appropriateness of pathway; involvement of patients and families; creation of new dedicated units; physical adapted activity.

Conclusion: This work produced a sound background on rehabilitation needs for Italy. Habilitation is part of the rehabilitation process and needs a much stronger multi-sector work so the education, labour and participation can be considered an integral part of it and this should be settled in the National Disability Action Plan that will be produced as a result of mapping Italian situation to the UNCRPD.

Keywords: United Nations, policies, habilitation, rehabilitation, Italy

[P-158]

Anxiety, depression and burnout status in caregivers of stroke patients

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Objective: The relationship between physicians, patients and caregivers of patient is very important for the success of treatment in rehabilitation of patients with stroke. The purpose of the study was to determine anxiety, depression and burnout status in caregivers of stroke patients.

Materials-Methods: The study was carried out on 72 caregivers of stroke patients who agreed to participate in the study. Socio-demographic characteristics of the stroke patients and their caregivers were recorded. Anxiety was assessed by Beck Anxiety Inventory, depression was assessed by Beck Depression Inventory and burnout was assessed by Maslach Burnout Inventory.

Results: Caregivers' mean age was 46.8 (SD 13.2) years. The vast majority of caregivers were women (87.5%), married (77.8%), housewives (54.2%) and primary school graduates (52.8%). 66.7% of them noted that their sleep patterns are affected by caregiving. The mean level of caregiver depression was found in the mild depressive border. The mean level of caregiver anxiety was found in the mild anxiety border. The scores obtained from the dimensions of burnout: emotional exhaustion subscale was found to be normal, the depersonalization subscale was found to be normal and personal accomplishment subscale was found to be normal, respectively.

Conclusion: The psychiatric component of stroke treatment and rehabilitation should not be only patient-centered. Moreover, individuals who provide care to the patient especially patients' relatives will need training and psychiatric support if needed. Rehabilitation program which is going to be applied should be revised in this respect.

Keywords: Anxiety, burnout, caregiver, depression, stroke

[P-157]

Social media motivating environment for elderly people

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Objective: The need to use the new technical possibilities to produce services for the growing number of elderly people has been recognized globally. It is not a relevant assumption that social media is for young generations. It can be used as a platform for different kind of services also for rehabilitation. Research and development project SoMedAll (Social Media for All Elderly people) concentrated on this area. Project belongs to the AAL (Ambient Assisted Living) Joint Programme in Europe. The objective of the project was to develop a service platform and service pages working in internet. The content of service pages are individually adaptable based on the users' needs and interests. The aim was to ensure the involvement of elderly people during the whole project duration.

Materials-Methods: This project was carried out in co-operation with partners from Finland, Italy and Slovenia. End users participated from Finland and Italy. As methods were used scenarios, social media club discussions, interviews, observation, questionnaires and Owela (open web based online space for user-driven innovation).

Results: The cultural differences between countries were taken into account. This effected to the test environment used in user evaluations. In Finland the main environment was PC (personal computer) and in Italy smart television, because Italian ageing people are not so familiar with PCs than ageing in Finland. 223 individuals answered using Owela questionnaire: 56% were females and 44% men. As a result 773 comments were given, 666 by elderly people and the rest were from researchers. Also 41 ideas and topics were collected. The Old Foxes service pages were opened in December 2012. There are more than 200 users.

Conclusion: Elderly people are interested and motivated to use social media if it is beneficial and easy to use. Elderly people need possibilities to learn how to use new services.

Keywords: Social media, new technology, elderly people, rehabilitation

[P-159]

Vocational rehabilitation for the youth with an increased risk of social exclusion in Finland

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Objective: Social policy debate in Finland highlights concerns about young people's social exclusion and increased child protection volumes. Social inclusion, particularly the transitions to education and employment is considered a critical stage in adolescent's life course. Though, service systems struggles with these objectives with adolescents with social problems or disability. The unidirectionality of labor market transitions towards sickness benefits and early disability retirement poses substantial challenges. The service models are mainly reactive and responsibilities are divided between several public sector agencies.

Materials-Methods: We present the background, the objectives, the methods and the current state of data collection within the research project "Present state and need for development of rehabilitation for the youth with increased risk of exclusion" (2012-2014) targeted at youth with an increased risk of being not in employment, education or training due to social problems or disability. The objective is to create an overview of the target groups with an emphasis on life course dependent welfare factors. Specific focus is on service needs and services provided. The pragmatic objective is to deepen the information base for development of more effective approaches targeted on preventing extended periods of sickness benefits and early disability pensions. The research consists of two complementary phases with different target groups. The first target group is youth in child protection services. The aim is investigate their need of support and the possibilities of vocational rehabilitation and other services during labor market transitions. The second target group is sickness benefit recipients and disability retirees under the age of 25. The aim is to investigate the role of vocational rehabilitation and other services in preventing the early retirement.

Conclusion: The approach is that of mixed methods. The analysis is based on a cohort register data, questionnaires for the youth and interviews of service sector professionals.

Keywords: Youth, social exclusion, vocational rehabilitation, disability pension, child welfare

[P-160]

The role of vocational rehabilitation in supporting clients' ability to remain in employment. A development project with a focus on rehabilitation into work, 2012-2014

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The aim of this development project is to improve the practices surrounding the evaluation of the need for vocational rehabilitation and to enhance the content of the rehabilitation through cooperation among stakeholders, as well as to integrate the rehabilitation services funded by the Social Insurance Institution flexibly into workplace efforts aimed at supporting work capacity.

Each group of rehabilitation clients is drawn from a single employer, with the clients' workplace supervisors participating in the evaluation of rehabilitation need. Recognizing that the clients' rehabilitation needs arise at the workplace, the rehabilitation intervention is planned with the close involvement of the workplace and the occupational health provider. The rehabilitation is implemented by an interprofessional team of the service provider. This model of rehabilitation delivery is flexible and takes into account the current rehabilitation needs not only of the individual client but of the group of rehabilitation clients as a whole. The model incorporates an individual assessment of each client (situational analysis) and both group-based and individual interventions. The programme is customized for each group of clients in cooperation with their employer and occupational health provider. An individual rehabilitation plan is drawn up for each client as well. The model consists of 3-8 separate rehabilitation consultations and a total of 7-21 full days of rehabilitation.

The rehabilitation is implemented by five service providers. The need and effectiveness of rehabilitation are evaluated by means of questionnaires and interviews conducted with the clients. The questionnaires focus on such topics as capacity for work, quality of life and goal attainment (GAS method). The circumstances of about 250 rehabilitation clients will be evaluated during the project.

Rehabilitation outcomes are examined not only from the individual client's point of view but also from the perspectives of employers, management, occupational health providers and rehabilitation service providers.

Keywords: Vocational rehabilitation, cooperation among stakeholders, Finland

[P-161]

Rehabilitation supporting integration into work: Multiple-constituency approach to evaluate a new vocational rehabilitation concept

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Working life is changing and rehabilitation services for people of working age should adjust to these changes. Form and content of vocational rehabilitation services call for innovations. Based on the earlier developing work, Social Insurance Institution of Finland has started a development project in which a new way of doing vocational rehabilitation is tested. The aims of the project are 1) to support the work ability of working people by means of rehabilitation and collaboration with employer 2) to develop and to test in practice a flexible and correctly timed rehabilitation model based both on individual's and employer organization's needs. Particular attention is being paid to guiding process to rehabilitation and in the process of defining the need for rehabilitation. The project implements tried procedures into established activity.

The development project (2012-2014) is evaluated using multiple-constituency approach. The purpose of the evaluation is to assess 1) the screening process of the participants in the model, 2) the implementation process, functioning and effectiveness of the model, and 3) the collaboration of the participants involved in the model. Evaluation consists of multiple perspectives and the object of the evaluation has been divided as follows: National Institute for Health and Welfare evaluates the project in individual level, Finnish Institute of Occupational Health evaluates the view of the occupational health care, Rehabilitation Foundation evaluates the rehabilitation service provider's view, and the Social Insurance Institution of Finland's Research Department concentrates on the participant's manager's view and on the coordination and the round-up of the evaluation as a whole.

The evaluation process will be described in the presentation. It uses mixed methods and multifaceted, continuing and systematic collection of data. Surveys, interviews, workshops and documentation analysis will be used.

Keywords: Vocational rehabilitation, evaluation, work ability

[P-162]

Start-up on an ICF learning network in Finland

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The ICF (International Classification of Functioning, Disability and Health) was translated into Finnish in 2004. However, lack of systematic education, clinical networks, a Finnish electronic version, and practical tools has prevented its widespread utilization in clinical practice. Networks can encourage partnerships in research, development and implementation activities. The National Institute for Health and Welfare (THL) initiated a learning network on the ICF issues in "Innovillage" during autumn 2012. This paper describes the objectives, connections and the initiated activities of the ICF learning network in Finland.

The ICF learning network is open for all interested in learning, education, development and research considering the ICF. It aims to identify challenges, develop, evaluate and disseminate the ICF-based practices by organizing workshops on the ICF-related topics. The network utilizes the developed virtual tools and services in Innovillage (joint workspace, project bank etc.). It is closely connected to the national TOIMIA network of social and health care professionals that collect and evaluate measurement tools used in disability assessment to an open access TOIMIA database (www.thl.fi/toimia/tietokanta). International collaboration has started with the ICF Research Branch, Switzerland.

The initiated and planned activities in 2012-2013 are 1) an email-post list to share the ICF-related information, 2) workshops on linking measures to the ICF, 3) implementing the ICF eLearning tool, 4) organizing ICF education, 5) preparing shared national ICF learning modules and materials, 6) translating the ICF User Guide and the ICF Core Set Manual, and 7) comparing linking results with the ICF Research Branch.

The key future challenges are to 1) create an open multi-actor network, 2) agree on shared objectives, working methods and information channels, 3) work systematically on the set objectives, and 4) disseminate the developed practices nationwide. It will be a permanent network to foster mutual understanding of functioning and disability.

Keywords: International classification of functioning, disability and health, networking, learning

[P-163]

Disability-case manager: Four years of training in Italy

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Objective: Our aim is to present the experience of Italian training for disability managers based on the biopsychosocial and on bioethics approaches. Disability-case management is a collaborative process that assesses, plans, implements, coordinates, monitors and evaluates the options and services required to meet clients' needs that refer to health and human services. The Italian training highlights the importance of a professional that supports people with disability and their families in dealing with different services and professionals and in finding an answer to their health, psychosocial and community needs. Disability-case management facilitates pathways of cure and care, as well as, helps to improve health and social outcomes for people facing difficult situations due to health conditions. Disability-case manager contributes to a better rehabilitation and habilitation processes as requested by article 26 of the UN Convention for the Rights of People with Disability.

Materials-Methods: In Italy, post-graduate education of disability-case managers started in 2009 at the Catholic University and the training has been developed by the faculty, in collaboration with the Neurological Institute Carlo Besta and with disabled people's organisations.

Results: After 4 years of this educational experience, 100 disability-case managers were trained, with a complete ICF training, as well as, a strong policy and bioethics education. This broad educational approach allows people to be able to deal with the full complexity of creating networks for people with disability in fragmented systems. The UN Convention provided the framework and the ICF biopsychosocial model of disability provided the tool to operationalize this Rights-based educational process.

Conclusion: The disability-case manager's main role is looking after and supporting the person with a disability, making specific interventions and creating a personalised care process. The person-based approach allows the disability-case manager to be flexible and opened to learn and explore different interventions, to better address the complex issues using a uniform framework.

Keywords: Disability, disability-case manager, international classification of functioning, disability and health, human rights

[P-164]

Functioning, disability and quality of life in patients with brain tumours and spinal disorders undergoing neurosurgery

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Objective: This study aimed to evaluate functioning, disability, quality of life (QoL) and well-being of patients undergoing neurosurgery.

Materials-Methods: An observational study was conducted on adult patients with brain tumour, spinal and cerebrovascular diseases enrolled at the National Neurological Institute Besta before neurosurgery from May 2012 to February 2013. The research protocol was composed of sociodemographic and clinical information, the assessment of cognitive functioning (MOCA), disability levels (WHODAS-12), well-being (PGWB-S), quality of life (EUROHIS-QoL) and coping strategies (BRIEF-Cope).

Results: A total of 119 patients were consecutive enrolled: mean age was 52.3 years (SD=13.4; range=21-85), 56% were females, 52% had at least high school education, 45% had a tumour, 25% cerebrovascular disease and 25% spinal disease. Mean MOCA score was 22.7 (SD=3.2), which is considered as mild cognitive impairment and lower than in the general population (26; $p < 0.001$). Mean score on disability levels was 25.8 (SD=18.3), which is similar to stroke patients (25.9; $p = 0.937$) and lower than in epilepsy patients (13.6; $p < 0.001$). Well-being mean score was 63.8 (SD=23.2), which is lower than in the general population (69.7; $p = 0.007$). QoL mean value was 3.43 (SD=0.59), whereas in the general population it is 3.68 ($p < 0.001$). The most frequently coping strategies used were behavioral disengagement, positive reframing, planning (mean scores higher than 5).

Conclusion: This study showed that patients with brain or spinal disorders present mild problems on cognitive functioning, high disability levels, low levels of well-being and QoL when comparing with general population. These findings suggest that several elements should be considered for a prognostic evaluation of patients that will undergo neurosurgery. Diagnosis alone is insufficient and data on personal characteristics, functioning and disability, intended as the interaction between a health condition and the environmental in which the person lives, are necessary to define tailored and personalised treatment, contributing to the success of a neurosurgical treatment.

Keywords: Disability, quality of life, neurosurgical treatment, brain tumour, spinal disease and cerebrovascular disease

[P-165]

Experiences of the ICF in clinical practice in Finland

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Objective: Since the International Classification of Functioning, Disability and Health (ICF) was endorsed in 2001, it has been widely applied in rehabilitation research. Despite a range of clinical applications of ICF, its widespread implementation in clinical practice is unclear. The aim was to study experiences of the ICF in clinical practice in Finland.

Materials-Methods: Three training workshops were arranged at Universities of Applied Sciences in Jyväskylä, Kotka and Seinäjoki in 2011-2012. Participants (n=98) were health care professionals who filled a questionnaire before the workshop. Structured and open questions related to use of the ICF both at their workplace and in their own work were included.

Results: Out of 92 respondents, 48 were physiotherapists, 26 occupational therapist, 8 speech therapist and others were physicians, neuropsychologists, music therapists, rehabilitation counsellors and so on. The ICF was widely discussed at their workplaces (75%) and the heads of the departments were supporting the use of the ICF (70%). Nearly half of participants (40%) used the ICF in clinical practice, e.g. assessment, intervention and/or documentation. However, only few had participated ICF education before (14%) and half of them owned the ICF book or had an opportunity to use it at workplace. The importance of education was obvious as it was highly necessitated before implementation (92%).

Conclusion: The specific skills needed to use the ICF in clinical practice must be taught. Because of the absence of the ICF book at workplaces, the electronic material is important. Therefore, an ICF project co-ordinated by Jamk was launched in 2012 in order to facilitate the use of the ICF in Finland. ICF eLearning Tool will be translated in Finnish, a systematic review of implementation of the ICF will be conducted, and experiences of professionals working at spinal cord injury rehabilitation centres will be studied.

Keywords: International classification of functioning, disability and health, clinical practice, implementation, education

[P-166]

Comparison between the brief ICF core set and the structured self-assessment questionnaire of functioning for patients with traumatic brain injury

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Objective: An ICF based structured self-assessment questionnaire of functioning (SATO) is used as a tool for rehabilitation planning of patients with traumatic brain injury (TBI) at the Tampere University Hospital Brain Injury Outpatient Clinic. In addition, the functioning is evaluated by a multi-professional team. Patients fill in the questionnaire at the beginning of the rehabilitation planning process. This promotes the patients to analyze their personal and environmental resources and disabilities. We compared the information acquired from the SATO and the brief ICF core set for TBI at the conceptual level. We also described three cases.

Materials-Methods: The brief ICF core set for TBI includes 26 concepts defining the disabilities of patients with TBI (scale from -4 to 0). The SATO consists of 51 concepts based on ICF defining both the personal and environmental resources and disabilities (scale from -4 to +4). We described functioning of three cases using both the brief ICF core set and the SATO.

Results: The information acquired from the SATO encompasses 81% of the concepts including the brief ICF core set. The brief ICF core set focuses on disabilities whereas the SATO provides more extensive information of the common impairments associated to TBI such as energy, sleep functions, handling stress and moving around places. It also enables focusing on personal and environmental resources and possibilities in addition to disabilities.

Conclusion: Patients' self-assessment of personal and environmental factors gives significant information for the multi-professional team planning rehabilitation. This makes the planning process patient-oriented, takes into account patients' individual experience of the functioning in his/her living environment and promotes the patients' participation in the rehabilitation process.

Keywords: International classification of functioning, disability and health, traumatic brain injury, rehabilitation plan, functioning, disability

[P-168]

The comparison of the effectiveness of physical therapy in patients with and without neuropathic component

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Objective: Chronic low back pain is one of the most prevalent pain conditions. The aim of this study was to investigate the effect of physical therapy in chronic low back pain with or without neuropathic component.

Materials-Methods: 40 female inpatients and outpatients with a diagnosis of chronic low back pain were included in the study. Age, demographic data, duration of low back pain, chronic disease, previous treatment, low back pain etiology and examination of the lumbar spine were recorded. The patients were assessed using the DN4 Neuropathic Pain Scale. Patients with score ≥ 4 were considered to have neuropathic pain, while patients with score < 4 were considered as having nociceptive pain. The patients received physical therapy 5 times a week for 3 weeks for a total of 15 sessions. Before and after the treatment, pain was evaluated using the visual analogue scale (VAS), functional capacity was evaluated using the Oswestry Disability Index (ODI) and quality of life with the Short-Form 36 (SF36).

Results: There was no statistically significant difference in age, duration of low back pain, previous treatment and low back pain etiology before and after the treatment ($p > 0.05$). In the neuropathic pain group, the neurological examination revealed hypoesthesia in 35% of the patients; there was no difference between the groups regarding the other components of neurological examination. There was no statistically significant difference between groups before the treatment in the VAS, the ODI and the SF36. After the treatment, statistically significant reduction in pain severity, increase in functional capacity and improvement in the quality of life were observed in both groups. After the treatment, the patients without the neuropathic component achieved larger improvement regarding the physical function component of the SF36 and the ODI ($p < 0.05$) than the patients with neuropathic pain component.

Conclusion: Chronic low back pain patients with neuropathic component partially respond to physical therapy.

Keywords: Chronic low back pain, neuropathic pain, health-related quality of life, oswestry disability index, visual analogue scale

[P-167]

Experiences of and prospects for an ICF-based assessment method

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At the Kumppaniksi association, we have used an ICF –based assessment method since 2006. The information we acquire through this method consists of self-assessment data from the customer and the observations of one or two external professionals concerning the customer's functioning status in different working environments. We use the information to assist our work of in rehabilitation and in decision-making in multidisciplinary teams. Currently, we have experience of more than one thousand assessment sessions.

Experiences and prospects are as follows: (1) Learning and using the method is simple. With about 60 enhanced qualifiers in use, self-assessments and writing down the observations of the professionals take only about half an hour. (2) The acquired information is useful in rehabilitation; graphical representation facilitates the use of data. (3) The method is flexible and adaptable both to the customer and the working environment. (4) The method shows the effectiveness of rehabilitation. (5) The method produces customer-specific statistical data as well as data that can be used for the development of operations and research.

In practice, the method has significantly facilitated our use of the ICF classification to support rehabilitation. It provides a user-friendly tool for us to produce the information we need in rehabilitation. The same information can also be used by multidisciplinary teams and for research into rehabilitation.

Keywords: vocational Rehabilitation, assessment, International Classification of Functioning, Disability and Health

[P-169]

Focus on family rehabilitation – What works in Finland

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Objective: We investigate the factors explaining success in multidisciplinary psychiatric family rehabilitation for children and their families. Our objective is to investigate what sort of changes take place in the children's situation through the rehabilitation intervention, and to analyse which factors predict positive changes or benefits given by rehabilitation for families.

Materials-Methods: We surveyed 440 children between 5 and 16 years and their parents before and after the rehabilitation. The pre and post rehabilitation parent questionnaires included Goodman's (1997) SDQ on their children's symptoms. We analyse the children's and parents perception of receiving help, and reduction in the SDQ scores using logistic regression.

Results: The parents reported that symptoms decreased in nearly two out of three children. The duration of rehabilitation, family coherence, and parents' concern over the well-being of their child predict reduction in symptoms measured using the SDQ. The duration and the form of rehabilitation (focusing on family therapy and group activity) and the social support received from the family and acquaintances predict parents' perception of having gained resources from rehabilitation. The duration and the form of rehabilitation (focusing on individual and family oriented rehabilitation), and the resources parents receive from rehabilitation predict children's perception of having gained help from rehabilitation.

Conclusion: Family rehabilitation should concentrate on the needs of both the children and their parents. As the challenges faced by the children and parents differ, the availability of different forms of family rehabilitation is needed.

Keywords: Family rehabilitation, children's mental health, effectiveness, evaluation

[P-170]

Fall prevention in subacute stroke rehabilitation setting

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Objective: To estimate the efficacy of a fall prevention protocol for inpatients in subacute stroke rehabilitation setting, where the incidence of falls based on analysis of falls in 2006 was 7/1000 patient-days, whereby almost one half of fallers fell more than once.

Materials-Methods: A consecutive series of patients admitted for the first time to the stroke rehabilitation ward at University Rehabilitation Institute, Slovenia, from 1 September 2010 to 30 September 2011 was studied. The score from the assessment sheet for fall prediction in stroke inpatients (ASFPSI; Nakagawa et al., 2008) was used as a predictive indicator of the risk for falls; general and individual measures were applied during the first 24 hours since admission and later a multidisciplinary approach was taken to the patients at high risk for falls. The patients' falls were prospectively recorded during the rehabilitation stay. The efficacy of the fall prevention measures was assessed by fall incidence (number of falls/1000 patient-days).

Results: 232 patients were included in the study. Mean time from the onset of stroke was 167 days (range 10-955), patients' mean age was 57 years (range 19-91), mean hospital stay was 50 days (range 3-88 days), mean total FIM score was 76.5 (range 20-126) at admission and 85.8 (range 20-126) at discharge, mean ASFPSI score was 3.9 (range 0-7). Thirty-five falls were registered during the study, 22 patients fell once, 5 twice and one patient three times. Two fifths of fallers fell in the first week after admission, one fifth in the first three days. The incidence of falls among the stroke patients admitted to the rehabilitation ward was 3/1000 patient-days.

Conclusion: Systematic global fall risk rating by the rehabilitation staff, the use of the assessment sheet for fall prediction at admission and a multidisciplinary approach to the patients with high risk for falls decreased the fall incidence for almost two thirds.

Keywords: Falls, prevention, fall risk rating, stroke, subacute rehabilitation setting

[P-172]

The effect of pregabalin in temporomandibular disorders

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Objective: Pregabalin is effective in treating many neuropathic pain conditions. The aim of this study was to determine the effect of the pregabalin in the temporomandibular disorders (TMD).

Materials-Methods: 17 patients were evaluated in Department of Physical Medicine and Rehabilitation, Temporomandibular Disorders Unit. Before the pregabalin treatment all patients had one or more medical drug but the pain control couldn't done. The patients used 300 mg of pregabalin for mean of 2 months.

Results: There were 17 patients who had used pregabalin for TMD. The mean age was 43.5 (SD 13.6) years. There were different diagnoses. The frequency of bruxism was 58.8%, dystonia 11.8%, myofascial pain syndrome 58.8%, reducible disc displacement 11.8%, non-reducible disc displacement 5.9%, joint degeneration 11.8%, and neuralgia 11.8%. The maximum mouth opening of the patients was 37.5 (SD 7.5) mm before pregabalin treatment and there were no significant difference after treatment. Although the 58.8% of the patients said that they did not benefit from pregabalin, 41.2% of the patients said that the pain decreased by 40% or more.

Conclusion: Pregabalin can be an alternative drug and can be used for resistant pain due to TMD.

Keywords: Pregabalin, pain, temporomandibular disorders

[P-171]

Gaps in European child health research: The RICHE project

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Objective: Identification of knowledge gaps and setting of priorities are strictly entangled with values that each researcher and/or stakeholder attributes to specific themes or policy issues and it varies between professions and countries. In the frame of EU RICHE project (www.childhealthresearch.eu) we aimed to develop a valid methodology to collect European stakeholders' views about child health research in Europe, to identify gaps and to get agreement on the most relevant gaps; bringing to needs for further research and funding towards Horizon 2020.

Materials-Methods: The above objectives were achieved in several steps. A questionnaire was sent to stakeholders to get their views on child health research. In parallel stakeholders' meetings took place in four European countries. Results were merged with literature findings, analysis of child health surveys and work of other project's groups. Finally, results were validated carrying out a Delphi survey. They are presented in this paper.

Results: Sixty three replies (14 European countries, 10 different professional backgrounds) to RICHE Gaps Delphi survey were analysed. For each of 72 identified research items respondents were asked to express their level of agreement on two issues: need for further research and need for its funding. The analysis allowed to group all research items according to the degree of agreement achieved among respondents in 4 groups. Gaps in European child health research were identified mostly in mental health, obesity and nutrition, pre and perinatal conditions, injuries and other environmental exposures, inequalities and disadvantaged groups, family and parenting, child development and wellbeing.

Conclusion: This work used a combination of established methods of priority setting in health research, produced a methodology-based list of gaps and proposed a valid way to prioritise them. It could facilitate the forthcoming priority listing for funding of Horizon 2020 European Research Programme.

Keywords: EU RICHE project, child health research, research gaps, children

[P-173]

The relationship between some acute phase reactants, quality of life, clinical measures, enthesopathy indices and disease activity in patients with ankylosing spondylitis

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Objective: The objective of the present study was to compare the relation between disease activity and quality of life, enthesitis indices, clinical and laboratory parameters in patients with ankylosing spondylitis (AS).

Materials-Methods: Fifty-three consecutive patients with AS (female 17, male 36) who fulfilled the modified New York criteria were included in this study. The demographic data of the patients were recorded. The laboratory evaluation of the patients comprised erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP). The disease activity was assessed using Bath Ankylosing Spondylitis Activity Index (BASDAI). The functional disability was evaluated using Bath Ankylosing Spondylitis Functional Index (BASFI) and Dougados functional index (DFI). The clinical status was evaluated with Bath Ankylosing Spondylitis Metrology Index (BASMI) and quality of life was assessed with Ankylosing Spondylitis Quality of Life Scale (ASQoL). Enthesitis was assessed by two indices: Mander Enthesitis Index (MEI) and Maastricht Ankylosing Spondylitis Enthesitis Score (MASSES).

Results: The patients were divided into two groups: patients having a BASDAI score of less than four (BASDAI<4) with mildly disease activity (n=42) and patients having a BASDAI score of four or higher (BASDAI≥4) with moderate to severe disease activity (n=11). MEI, MASSES and BASFI scores were significantly higher in patients with moderate-severe disease activity. No significant difference was found in terms of CRP, BASMI and ASQoL between two groups. But a significant correlation was found between the BASDAI score and MEI, MASSES, CRP, DFI and BASFI in all patients (the correlation coefficients were 0.538, 0.544, 0.328, 0.407 and 0.466 respectively; all p-values < 0.05).

Conclusion: Laboratory findings are not enough to evaluate disease activity in AS. However CRP seems to have better correlation with disease activity than ESR and enthesitis indices seem to be an appropriate surrogate for disease activity in AS patients. Further investigations are needed to enlighten this issue.

Keywords: Ankylosing spondylitis, disease activity, quality of life, enthesitis

[P-174]

Paravertebral abscess mimicking lumbar radiculopathy: A case report

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Radiculopathy is the term used to define similar clinical conditions that are all caused by compromise of the nerve roots. We report on a patient with paravertebral abscess mimicking radiculopathy.

The 54-year-old female patient was hospitalized with radicular pain in her two legs, markedly in right lasting 15 days. She has had low back pain for several years and has chronic renal failure, hypertension and a history of cerebrovascular disease. Lumbar spinal motions were painful in all directions. Straight leg raise test was positive in the right leg. Sacroiliac compression tests were negative bilaterally. Neurologic examination revealed no pathology. Laboratory findings were as follows: Hb:8.5g/dL, WBC:14.600/ μ L, ESR:130mm/h, CRP:104mg/L. Lumbar MRI was reported as 'posterocentral-right paracentral disc protrusion at the level of L2-L3, compressing right L3 root, posterocentral protrusion at the level of L3-L4, posterocentral herniation and left foraminal protrusion at the level of L4-L5 compressing bilateral L5 root'. Surgical intervention for radiculopathy was suggested by the neurosurgeons but the patient did not accept it. 37.5 mg tramadol + 325 mg paracetamol therapy was given three times a day and hotpack, therapeutic ultrasound and transcutaneous electrical nerve stimulation was performed for pain. There was no focus of infection. As her pain could not be alleviated during her follow up, abdominal CT was performed with a suspicion of intraabdominal abscess. Abdominal CT revealed paravertebral abscess in front of L3-L4 vertebra bodies with a size of 43x13 mm. The patient did not accept biopsy. Sulbactam-ampicillin 1 g three times a day was applied intravenously. During the follow-up, both her pain and paravertebral abscess regressed.

In our case there was a paravertebral abscess mimicking radiculopathy and the coexistence of radiculopathy has delayed the diagnosis. The clinicians must be aware about infectious conditions especially in the patients who have chronic inflammatory diseases such as chronic renal failure.

Keywords: Radiculopathy, paravertebral abscess, chronic renal failure, low back pain

[P-176]

Functional outcome after hand injury caused by electricity

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Consequences caused by an injury from electricity are various and depend on kind of electricity, voltage, path of passing through the tissue. Hereby we'll show the methods applied whilst curing. After being injured, the patient (male, old 50 years, sales manager) was admitted to hospital in bad general condition in intensive care. The primary surgical operation of burns was done under general anesthetic. The surgical intervention was done as follows: incision of devitalized muscular of both forearms and setting up the skin-graft. Early physical treatment has been commenced in intensive care. Eight weeks from the injury the patient was dismissed in good general condition and he continued with rehabilitation. In order to make diagnosis we made EMNG and Duplex scan artery (lesion of n.medianus et n. ulnaris bill. and good flew of arteries). Besides the kinesytherapy and occupational therapy, we also applied: magneto-therapy, laser-therapy, exponential currents, and electrophoresis with Thyomucase as well as paraffin therapy. Every three weeks we've been measuring the volume of mobility of joints, then we did manual muscle test, control at physiatrist's supplement and change of therapies. EMNG control after 3 months showed signs of nerves reinnervation. After six months, he was completely independent in activities of daily life according to the Barthel index test. The final result was satisfactory, both arms in function for everyday life. He is completely back to his work. In conclusion, I'd like to point out that when fact with such injures besides well done diagnosis and surgery early rehabilitation treatments are of crucial importance as well as team work, evaluation of diagnosis, good cooperation with a patient, healing period and good choice of physical procedures with long lasting kinesytherapy.

Keywords: Electrical injury, physical therapy, functional outcome

[P-175]

Spinal accessory nerve palsy: Evaluation of two cases and review of the literature

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Objective: Spinal accessory nerve palsy (SANP) is a rare focal neuropathy. The majority of the lesions of the SANP occur as an iatrogenic injury usually after lymph node biopsy and various tumor resections in the posterior cervical triangle. In these iatrogenic cases, the SANP can be diagnosed without any difficulties. However non iatrogenic SANP are reported and trauma is considered to be the most common cause.

Materials-Methods: In this report, two cases of spinal accessory nerve palsy whom are 37 (female) and 47 (male) years old are presented. In one of them, accessory nerve palsy developed interestingly after the surgery for gingival tumor and in the other case after a papillary carcinoma thyroidectomy. Scapular or neck pain, shoulder weakness, shoulder girdle depression, trapezium atrophy, limited active coronal plane abduction, scapular flip sign, and weakness of middle and lower trapezium and of the sterno-cleido-mastoid are the most frequently noted clinical manifestations in the two patients.

Results: A rehabilitative program was prescribed. Both of them were placed on an outpatient and home exercise program, which included reeducation of the middle and lower trapezium, gravity eliminated resistance exercises for the upper trapezium, manual resistance exercises including proprioceptive neuromuscular facilitation of the scapula-humeral muscles, and weighted resistance of the biceps and triceps. Upon clinical evaluation we observed a very significant improvement in pain symptoms and mobility for the two patients.

Conclusion: Lesions of the SANP can be identified and differentiated from other clinical entities by careful history and physical examination. Early diagnosis and physical treatment of SANP may lead to more effective pain relief and a better functional outcome.

Keywords: Spinal accessory nerve palsy, shoulder pain, trapezius muscle palsy, rehabilitation

[P-177]

Habits and care consumption of patients with chronic musculoskeletal disorders in an outpatient department of physical medicine and rehabilitation

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Objective: To study care consumption patterns in patients with chronic musculoskeletal disorders.

Materials-Methods: A descriptive cross-sectional study was conducted during two months (January and February 2013) using questionnaire-based interviews performed by a physician among patients diagnosed with chronic degenerative disease (low back pain, back pain, neck pain, knee osteoarthritis). The questionnaire included demographic and clinical information, drugs consumption, rehabilitation treatment, use of alternative therapies. Satisfaction was evaluated at the end of treatments thanks to a visual analogue scale (VAS/100). Patients were classified as satisfied (VAS>75%), moderately satisfied (VAS 50-75%) and not satisfied (VAS<50%).

Results: We recruited 50 patients with an average age of 48.7 (SD 15.0) years (33 women and 17 men). The mean duration of symptoms was 4.5 years. 34 patients (68%) had consulted a rheumatologist and 9 (18%) an orthopedist before consulting physiatrist. Medication was analgesics class 1 in 38 (76%) and class 2 in 18 Cases (36%), NSAIDs in 35 cases (70%) and muscle relaxant in 4 (8%). Six patients (12%) never underwent rehabilitation and 44 (88%) had done at least 12 sessions. Fifteen patients (30%) did self-rehabilitation. In 3 cases (6%), Tunisian traditional therapy was used. According to satisfaction classification with drug treatment and rehabilitation, our patients were classified respectively as satisfied [5 (10.8%) and 15 (39.5%)], moderately satisfied: [16 (34.8%) and 18 (47.3%)] and not satisfied [29 (54.4%) and 17 (13.2%)].

Conclusion: Tunisian patients are followers of self-medication, but are best met by the re-education versus drug treatment, and have no confidence in traditional therapy.

Keywords: Musculoskeletal disorders, medical consumption, functional rehabilitation

[P-178]

Nicolau syndrome or embolia cutis medicamentosa: The dark side of the road

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Nicolau syndrome is a rare adverse reaction associated with intramuscular injection of various types of drugs; such as antibiotics, vitamins, vaccines and non-steroidal anti-inflammatory drugs. The clinical picture includes local intense pain at the injection site followed by ischemic pallor of the skin which evolves into an erythematous macule and becomes hemorrhagic and ulcerates. Eventually the ulcer heals with an atrophic scar.

We present a 52 years old female patient who applied at the hospital with pain and skin darkening at the injection site of diclofenac sodium which she was prescribed for her back pain. Hours after the third injection she complained of severe pain, itching and redness in her right buttock that progressively increased. After three days the redness turned to an area of darkly colored skin.

Dermatologic examination on the 4th day of intramuscular injection revealed a 6x9 cm ulcer with a very thick, adherent, black necrotic crust on the right glutea and the patient was diagnosed as Nicolau Syndrome. One week later the progression of the lesion had stopped. Secondary intention healing with enzymatic debridement was started as treatment. However, slow clinical response lead patient to anxiety which made it necessary to alter the treatment as surgical debridement and primary closure. The wound healed uneventfully.

Nicolau Syndrome is a rare and threatening complication of intramuscular injection of drugs and the onset cannot be predicted. Clinicians should be aware of this rare condition when they encounter patients with severe localized pain after intramuscular injection of any medicine followed by necrotic ulceration.

Keywords: Nicolau syndrome, tissue necrosis, diclofenac, adverse reaction, intramuscular injection

[P-180]

Rehabilitation of bilateral facial paralysis complicating B-cell low grade lymphoma

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Simultaneous bilateral facial paralysis is an uncommon condition with an annual incidence of approximately 1 per 5 million. It may be idiopathic or associated with various disorders including Lyme disease, Guillain-Barre syndrome, sarcoidosis, viral infections, syphilis, pontine gliomas and leukemia.

A 63-year-old male was referred to the hematology department with a prediagnosis of lymphoma and 2-week history of right sided complete facial weakness. On the 7th day of hospitalization he also developed facial weakness on the left side. The patient was diagnosed with bilateral peripheral facial paralysis and referred to the physical medicine and rehabilitation department. He was started on a physiotherapy and rehabilitation program comprised of electrotherapy, manual massage and exercise. Galvanic current was applied to the facial muscles of both sides as three sessions per week. After 12 sessions of electrotherapy, daily massage and exercise for 4 weeks, significant improvement was detected on both sides in terms of sensation and facial muscle strength.

In this report we presented an extremely rare case of bilateral peripheral facial paralysis due to B-cell low grade lymphoma and the improvement with electrotherapy and rehabilitation techniques.

Keywords: Facial paralysis, lymphoma, physiotherapy, rehabilitation

[P-179]

The area of rehabilitation research: An organizational proposal in the Italian healthcare reality

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Objective: Our aim is to outline the concept of clinical governance (CG) and its evolution in international healthcare organizations, emphasizing the role of evidence-based physiotherapy (EBP) as an essential element for the application of governance; analyze how this aspect is structured in healthcare organizations in Northern Italy, and finally propose two models for the implementation of the “area of clinical research” for rehabilitation hospital management.

Materials-Methods: The method used is a review of the literature summarizing the national/international studies produced on the subject of CG. The research about organizational models found in Italian companies, summarizes the data presented by the National Observatory of Health Professions (2006).

Results: Though there are many studies that address the issue of clinical governance, only a few of them, mainly national, offers organizational models of the “clinical research area” in particular for the rehabilitative area; by assessment of the Italian experience, we propose two models: 1) as a strategic area structured within the Directorate-General, to provide a technical transverse support and 2) as “team infrastructure” with widespread responsibility, placed in the Direction of the Health Professions, able to strategically oversee the GC (which is already a proposal in quality management systems by Galpin, 1998).

Conclusion: EBP is today one of the tools for the application of CG and is a method of applying the results of research to the individual patient, extending the planning of health policy: the Evidence-based Health Care (EBHC). The Italian reality still lacks is the presence of areas of clinical research in health care organizations so EBHC application need to have innovative organizational models such as those proposed in our study, which allow the formation of networks of professionals of EBP, inside and outside the organizations.

Keywords: Clinical governance, evidence-based physiotherapy, healthcare organization, rehabilitation, research

[P-181]

Venous insufficiency in a patient with poliomyelitis

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Poliomyelitis is a viral disease infecting anterior horn cells of medulla spinalis. Although polio was eradicated in many countries, it is still endemic in some countries and there are many people with poliomyelitis sequel. We present a paralytic poliomyelitis case with venous insufficiency in the paralytic lower limb.

A 43-year-old woman with poliomyelitis (since she was three years old) was applied to our clinic with muscle weakness, swelling and fatigue in her right leg which has been going on for three years. Her complaints were getting worse during standing. Her medical history was otherwise noncontributory. Physical examination yielded weakness of hip joint (2/5), knee flexion/extension (2/5), ankle dorsiflexion (0/5) and plantar flexion (3/5) on her right side and those of were 4/5 on her left side. Additionally, right lower limb muscles were flaccid. She had no sensory deficits. There was no difference between the lengths of the lower extremities. The circumferential measurements of the right extremity at 10 cm proximal and 5 cm distal of the patella were 3 cm wider than those of left. Venous doppler ultrasound of the lower extremities was consistent with the deep venous insufficiency. Exercises improving venous circulation, elevation, compression socks were recommended. She was also consulted to vascular surgery department and clinical/radiological follow-up was recommended. At the end of the rehabilitation program, our case was able to ambulate with foot-up and an aluminum cane-assist.

Patients who have poliomyelitis in lower extremities may have venous insufficiency due to muscle weakness, reduced muscle tone, muscle atrophy and immobility. Further, venous insufficiency can cause deep venous thrombosis and pulmonary embolism. Venous insufficiency and possible related complications should be kept in mind in relevant patients with poliomyelitis.

Keywords: Poliomyelitis, rehabilitation, venous insufficiency

[P-182]

Demographic and diagnostic characteristics of the patients of the Antalya Neuromuscular Disease Centre

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The Antalya Neuromuscular Disease Centre was established within Antalya Education and Research Hospital, Turkey, in June, 2011 in collaboration with Physical Medicine and Rehabilitation and Neurology clinics. Patients are diagnosed multidisciplinary by clinic, electrophysiological, pathologic and genetic evaluation. 67 patients were enrolled in 2011, 79 patients in 2012 and 17 patients in 2013, for a total 163 up to now in our centre.

There have been 18 (11%) motor neuron disease patients, 14 of them with amyotrophic lateral sclerosis and 4 of other type, with a mean age of 53.4 (SD 14.2) years; 18 (11%) patients have been diagnosed with myasthenia gravis, with a mean age of 49.8 (SD 21.5) years; 59 (36%) patients have been diagnosed with muscular dystrophy, with a mean age of 28.7 (SD 14.5) years; 16 (9.8%) patients have been diagnosed with myotonic dystrophy, 23(14.1%) patients with myopathy, 8 (4.9%) with hereditary neuropathy, 7(4.3%) patients with acquired neuropathy, 4 (2.5%) with congenital muscular dystrophy, and 5 (3.1%) patients have been diagnosed as spinal muscular atrophy.

Function, mobility and activities of daily living were assessed using the 10-meter timed walk test, time-to-rise-from-the-chair test, chair sit-to-stand test in 30 seconds, grip strength test, pinch strength test, the Barthel Index and the Rivermead Mobility Index. Quality of life was assessed using the Short Form-36. The patients are visited in every three months and planned physical therapies are applied accordingly.

Keywords: Neuromuscular disease, demographic characteristics, diagnostics

[P-184]

Cutaneous infection due to fusarium brachygibbosum in the patient with hemiplegia and diabetes mellitus: A case report

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In diabetic patients, fungal and bacterial infections may increase the risk of developing diabetic foot syndrome. Among the risk factors that contribute to the development of diabetic foot infections are local neuropathy, vascular changes, long term immobilization, and depressed local host defenses. The microbiology of these infections is often complex and can be polymicrobial. We report a 54-year-old woman with a history of right hemiplegia due to cerebrovascular ischemia 15 years before. In her history, she had hypertension, and right renal arterial obstruction due to diabetes mellitus. She had suffered from a diabetic foot wound on the left heel for a few months. In her examination, there was no more neurological deficit except right hemiparetic findings. The wound was approximately 3x2x0.5 cm ulceration with cellulitis. The risk factors such as environmental causes, additional infection sources were also evaluated. *Fusarium* spp. and *Pseudomonas* spp. were isolated from the tissue culture of foot wound. A detailed morphological study showed that the isolate was *Fusarium brachygibbosum*, which was confirmed by rDNA sequencing. Osteomyelitis was not determined. Wound had been improved with health by debriding the necrotic tissue and anti-pseudomonal therapy in 2 weeks. Recovery was confirmed at follow-up 3 months later. Since all kind of infections cause long term immobilization which leads poor recovery of hemiplegia, emergent fungal pathogens should be kept in mind in the presence of diabetes mellitus.

Keywords: Immobilization, *Fusarium*, diabetic foot wound, emergent fungal pathogens

[P-183]

Is osteoarthritis a new classification criterion for metabolic syndrome?

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Objective: The aim of our study was to examine the frequency of the metabolic syndrome (MeS) in osteoarthritis (OA) patients and investigate the relationship between demographic and clinical criterias between different types of osteoarthritis.

Materials-Methods: 87 patients with OA participated in this study. Demographic (age, sex, body mass index) and clinical (type of osteoarthritis, risk factors of osteoarthritis, metabolic syndrome criteria) characteristics of all the patients were recorded. Radiological assessments for the degree of OA were carried out by the Kellgren-Lawrence method.

Results: A total of 87 patients (76 female and 11 male) OA patients, with a mean age of 62.7 years (SD 9.7) were included in the study. The osteoarthritis was generalized in 43 (49.4%) patients and the most frequent diagnosis was gonarthrosis (26, 29.9%). The least frequent diagnosis was coxarthrosis. Among patients with OA, MeS was found in 39 (44.8%) female and 2 (2.3%) male patients. There was a significant correlation between the presence of MeS and gender in OA patients in the sense that female patients had higher rates of MS ($p < 0.05$). No relationships were found between MeS determinants and determinants of OA.

Conclusion: Female patients with OA have higher rates of MeS compared to male patients. We could not find a relationship between OA and clinical determinants of MeS. Moreover, MeS was strongly related with the risk factors for OA. Modest change in risk factors for osteoarthritis might therefore help to reduce the incidence of metabolic syndrome and vice versa.

Keywords: Osteoarthritis, metabolic syndrome, obesity, gender, hypertension

[P-185]

Quality of life and associated conditions in women with fibromyalgia syndrome

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Objective: Fibromyalgia syndrome (FMS) is a rheumatic disease of unknown etiology, characterized by widespread pain and tender points at specific anatomical regions. Patients' daily activities and quality of life (QOL) might be affected by severe pain which is accompanied by fatigue, sleep disturbance and psychiatric symptoms. In this study, the QOL of women with fibromyalgia and the relationship between the QOL and socio-demographic characteristics, depression and sleep disturbance were investigated.

Materials-Methods: One hundred women with diagnosis of FMS according to the ACR (American College of Rheumatology) criteria (1990) were studied. Socio-demographic characteristics were questioned in detail. Fibromyalgia Impact Questionnaire (FIQ) was used to assess QOL. Visual Analogue Scale (VAS) (0-10cm) was used to assess the severity of widespread pain and sleep disturbance. Depression was assessed by using Beck Depression Inventory (BDI).

Results: Mean age was 42.2 (SD 9.5) years and mean duration of disease was 32.3 (SD 29.4) months. The mean FIQ total score was 59.5 (SD 14.2) and 26% of the patients were severely affected. There was no association between FIQ scores and socio-demographic variables. There were statistically significant relationship between FIQ scores and pain VAS, sleep disturbance VAS and BDI scores. In the multivariate regression analysis, pain was the most contributing variable to FIQ level and it was followed by sleep disturbance and depression scores, respectively.

Conclusion: Depression and sleep disturbances are commonly encountered in patients with fibromyalgia which result in deterioration of QOL and increased perception of pain. Hence, the clinical evaluation of fibromyalgia should involve the evaluation of depression and sleep disturbances. Understanding the severity and interrelation of these variables is important to improve adequate and detailed strategy for management of fibromyalgia.

Keywords: Depression, fibromyalgia syndrome, pain, quality of life, sleep disturbance

[P-186]

Identifying risk factors associated with severe or complete mobility limitations at discharge of inpatients in rehabilitation hospitals

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Objective: To describe the proportion of inpatients with severe or complete mobility limitations at discharge and to identify associated patient characteristics and aspects of delivery of care.

Materials-Methods: Exploratory study using a cohort of 239 consecutive inpatients of a French rehabilitation hospital. The study had three measurement periods: 1)at baseline, measuring socio-demographic (age, sex, education level, residence), physiological (number of comorbidities, fragility, use of multi-medication,) and functional patients' characteristics (functional independence measure, mobility activity measures); 2) throughout their stay, measuring incidence of adverse effects (infections, complications, sentinel events, falls –related events and others); 3) at discharge, measuring mobility limitations by the Mobility Activity Measure in inpatient rehabilitation settings (range 0-100). Mobam scores were categorized according to qualifiers of International Classification of Functioning (no, mild, moderate, severe or complete difficulty).

Results: A total of 26 patients (10.9%) had severe mobility limitations. A multivariate logistic regression model using level of mobility limitation as dependent variable (severe or complete/not) -with adjusted R²>53%- indicated that patients with adverse event, high fragility and low functioning on mobility activities measures at admission increased the odds of having severe or complete mobility limitations at discharge. Incidence of adverse event during stay was particularly relevant with odds ratio of 8.6 (95% CI 2.5-29.4).

Conclusion: Results of this study suggest that adverse effects are relevant on incidence of severe disability at discharge of inpatients in rehabilitation hospitals. Health care management should also be careful for preventing adverse events. Future studies should identify incidence of adverse events in rehabilitation hospitals and to determine their impact in terms of disability and other events (death, prolongation of stay).

Keywords: Disability, adverse events, patient safety

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